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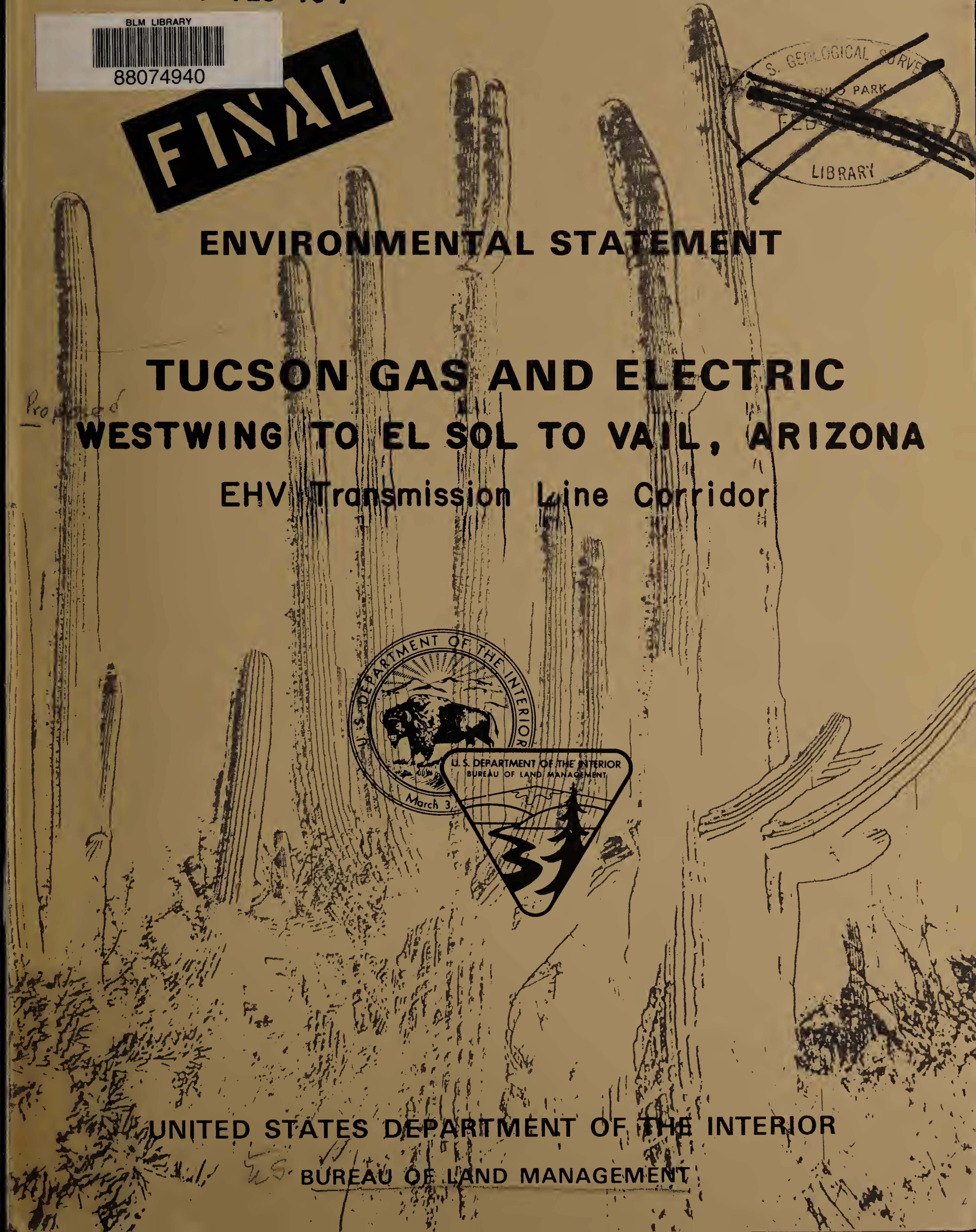

FINAL

# ENVIRONMENTAL STATEMENT

Proposed

# TUCSON GAS AND ELECTRIC
## WESTWING TO EL SOL TO VAIL, ARIZONA
## EHV Transmission Line Corridor

UNITED STATES DEPARTMENT OF THE INTERIOR

BUREAU OF LAND MANAGEMENT

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# PROPOSED WESTWING TO EL SOL TO VAIL
# EHV TRANSMISSION LINE CORRIDOR

## FINAL
## ENVIRONMENTAL STATEMENT

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Director

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# SUMMARY

Draft ( ) Final ( X ) Environmental Statement

Department of the Interior, Bureau of Land Management, Arizona State Office

For additional information, contact Arizona State Director, Room 3022 Federal Building, Phoenix, Arizona 85025; Phone (602) 261-3873.

1. Right-of-Way Grant Administrative Action (X) Legislative Action ( )

   Westwing - El Sol - Vail
   EHV Transmission Line Corridor

2. The Department of the Interior proposes to grant a right-of-way to Tucson Gas & Electric Company to construct one transmission line from Phoenix to Tucson, Arizona, in Maricopa, Pinal, and Pima Counties. The proposed line is an extension of the power distribution system from the Navajo Generating Plant. Anticipated power needs in the Tucson area will require additional transmission lines from Phoenix to Tucson which would parallel the proposed line.

3. Adverse impacts of the transmission system include an intrusion into a wild area, creation of new access into a wild area, possible loss or degradation of archeological artifacts, and an intrusion into and a possible negative impact upon Indian cultural values. Actual construction impacts during the short term are not expected to have a significant negative impact upon biological systems.

4. Alternatives Considered:

   A. Alternative routes.
   B. No transmission line.
   C. Use or upgrade existing transmission lines.
   D. Underground transmission lines.
   E. Double circuit towers
   F. Other power sources.
   G. Larger capacity transmission line.

5. Comments on the Draft Environmental Statement were received from the following groups, organizations, and individuals:
   - Bureau of Mines, Intermountain Field Operations Center, USDI
   - Bureau of Outdoor Recreation, Pacific Southwest Region, USDI
   - Soil Conservation Service, USDA
   - Federal Highway Administration, Region 9, Department of Transportation
   - Denver Service Center, Bureau of Land Management
   - Corps of Engineers, Los Angeles District, Department of the Army
   - Bureau of Sport Fisheries & Wildlife, Region 2, USDI
   - Geological Survey, USDI
   - Bureau of Indian Affairs, USDI
   - Environmental Protection Agency, Region IX
   - U. S. Coast Guard, Department of Transportation
   - Rural Electrification Administration, USDA
   - National Park Service, USDI
   - Department of Health, Education & Welfare, San Francisco Region
   - Bureau of Reclamation, USDI

U.S. Bureau of Land Management / Exchange 1/30/75

Federal Power Commission
Department of Housing and Urban Development, Washington, D.C.
Advisory Council on Historic Preservation
Arizona Bureau of Mines, University of Arizona
Arizona State Clearinghouse, Office of Economic Planning & Development
Maricopa County Parks & Recreation Commission
Arizona Highway Department
Tucson Cactus & Botanical Society
Environmental Conscience Corporation
John F. Goodson, Attorney, Cunningham, Goodson & Tiffany, Ltd.
Steve Bingham, Chairman BLM Lands Committee, Arizona Wildlife Federation
Robert S. Lynch, Attorney, Rawlins, Ellis, Burrus & Kiewit
Southern Pacific Transportation Company

6.A. Date Draft Statement made available to Council on Environmental Quality and the public: January 28, 1974

B. Date Final Statement made available to Council on Environmental Quality and the public:

JAN 20 1975

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# ENVIRONMENTAL IMPACT STATEMENT

# WESTWING TO EL SOL TO VAIL EHV TRANSMISSION LINE CORRIDOR

## I - DESCRIPTION OF THE PROPOSAL

### A. SUMMARY OF EVENTS MODIFYING ORIGINAL PROPOSAL

On January 28, 1974, the Bureau of Land Management, Department of the Interior, issued a draft impact statement entitled "Tucson Gas and Electric El Sol to Vail, Arizona 345 kv Transmission Lines," (INT DES 74-7).

A number of significant events have occurred during preparation and subsequent to issuance of the draft that relate to the proposed action.

To enable the reader to review the events that have occurred as part of the continuing assessments under the environmental impact statement process, the following summary of action is included in this document.

On February 4, 1972, an environmental impact statement (FES 72-1) was completed by the Bureau of Reclamation analyzing the environmental impacts of construction of the Navajo Coal Fired Generating Station at Page, Arizona, and two 500 kv lines from the plant to the existing Westwing Substation located northwest of Phoenix, Arizona.

Tucson Gas & Electric Company (TG&E) is to receive 7.5 percent of the power or approximately 173,000 kilowatts from Navajo. (The first of three units planned for the Navajo Power Plant and the two 500 kv lines are presently completed and in operation.)

The environmental impacts of a transmission line to get power from Westwing to Tucson were not covered under the environmental impact statement prepared for the Navajo Plant and associated 500 kv lines.

On March 15, 1971, TG&E made preliminary contacts with the Bureau of Land Management office in Phoenix and advised the Bureau that they were initiating studies of possible routes for powerlines to transmit their share of Navajo power from Westwing to the Tucson area. The proposed lines would originate at Westwing and enter TG&E's present distribution system at a substation named Vail, which is in existence south of Tucson, Arizona.

On August 28, 1972, TG&E filed a preliminary application with BLM for a right-of-way for two 345 kv transmission lines (A-7274) proposed to cross certain BLM lands located in Maricopa, Pinal, and Pima Counties, Arizona. In reviewing the preliminary application it was apparent that the proposed action would result in major environmental impacts, and an environmental impact statement would be required. The Arizona State Director for BLM was assigned lead responsibility for preparation of an environmental impact statement on October 5, 1972.

On November 17, 1972, TG&E filed their perfected application for right-of-way (A-7274) and their Applicant's Environmental Analysis (as required by Subpart 2851.2-1(c)(6)(i), 43 CFR). The perfected application was for one 345 kv transmission line. [BLM's policy does not permit granting a right-of-way for lines that are to be constructed at some future date.] TG&E planned to construct one 345 kv line immediately and one 345 kv line within 5 or 10 years.

Since two lines were eventually planned for construction, it was decided that the EIS would be prepared analyzing the impacts of two transmission lines so that the cumulative or long-term impacts of issuing the first right-of-way could be properly analyzed.

Although it was known that TG&E's lines would transmit power from Westwing to Vail, initial studies showed that the portion of line from Westwing to a point near El Sol (another existing substation approximately 9.5 miles due south of Westwing) would be constructed by Arizona Public Service (APS). In an attempt to reduce the total number of lines needed between Westwing and El Sol, TG&E and APS agreed to share towers. The plan was for APS to construct two sets of towers, each of which would eventually carry two lines--a 230 kv for APS and a 345 kv for TG&E. (See Fig. 4.)

On June 5, 1973, APS went before the Power Plant and Transmission Line Siting Committee of Arizona, in conformance with the requirements of Arizona Revised Statutes Sec. 40-360, et seq., for a Certificate of Environmental Compatibility authorizing the construction of a Proposed 230 kv Transmission Line from Westwing Substation (existing) to El Sol Substation (existing) to Agua Fria Substation (existing).

The Siting Committee, after analyzing the information prepared in support of the APS application, selected a route different from the 9.5 mile route preferred by APS. This information and the minutes are a matter of public record and are on file at the Arizona Corporation Commission Office, 211 Annex Building, 1688 W. Adams St., Phoenix, Arizona (Case No. 9).

The result of the Siting Committee's selection of a different route for this segment increased the line length from 9.5 to 12.2 miles, and the approved route meant crossing three parcels of BLM-administered lands for a total distance of approximately 1.9 miles.

On October 1, 1973, APS filed application (A-7731) with the Bureau of Land Management for right-of-way to construct the proposed powerlines along the route approved by the Arizona Siting Committee.

On January 28, 1974, BLM issued the draft environmental statement (DES INT 74-7) covering TG&E's proposed powerlines from El Sol to Vail.

On February 11, 1974, an Environmental Analysis Record (EAR) prepared by BLM concluded that the issuance of a right-of-way across 1.9 miles of national resource lands for the lines proposed by APS would not constitute a major Federal action requiring a formal environmental impact statement. This EAR was circulated through the Arizona State Clearinghouse in accordance with established procedures, to insure public exposure. This EAR has now been revised (September 11, 1974), reflecting the fact that, although issuance of a right-of-way to APS is not in itself a major Federal action, the proposed lines do form a connecting link of part of a major Federal action for which a formal EIS is being prepared. This revised EAR is included as Appendix 12.

On February 4, 1974, TG&E perfected their application for the second line from the vicinity of El Sol to Vail and requested issuance of a right-of-way for construction of a 500 kv line. Since the draft environmental impact statement had already been issued, this application was not discussed as a part of the proposed action.

Since TG&E's power allocation from the Navajo Plant could be transmitted using one 345 kv line, it is obvious that additional sources of power must be developed before the additional line capacities would be needed. Power may come from the proposed nuclear plant west of Phoenix, Kaiparowits, additional units at Navajo, or some other source. In any event, TG&E's proposal to construct larger capacity lines now is an attempt to reduce the total number of lines that will eventually be needed from Phoenix to Tucson. The alternative of constructing larger capacity lines was suggested by a number of individuals who commented on the draft EIS (see Section VII).

On April 18, 1974, TG&E advised BLM that studies were underway to determine the economic feasibility of constructing both of their proposed lines at 500 kv.

If TG&E obtains financing to construct the first line from El Sol to Vail at 500 kv, and if they get additional power through Westwing, then one of the two sets of towers presently planned from Westwing to El Sol would be used to transmit the 500 kv. The towers that were originally designed to be shared by APS and TG&E would not be large enough to carry TG&E's 500 kv and APS' 230 kv lines on the same towers. Thus APS could use one line of towers with two 230 kv lines, and TG&E could construct a parallel set of towers supporting a single 500 kv line. The end result would still be two sets of towers between Westwing and El Sol. (See Alternatives section and EAR in Appendix 12 for a more detailed discussion of possible line configuration between Westwing and El Sol.)

On August 5, 1974, TG&E appeared before the Arizona Siting Committee and was granted a Certificate of Environmental Compatibility for a possible increase in line size from 345 kv to 500 kv for construction of one line from Westwing to Vail.

The action approved by the Siting Committee, as quoted from the minutes of the proceeding is:

> " . . . . in the matter of Case No. 15, which was the request of Tucson Gas & Electric for authorization to change line voltage from 345 kv to 500 kv in a proposed transmission line from Westwing substation to Vail substation, I would move that the application for Certificate of Environmental Compatibility be approved. I would like further to say that the intent of that motion would be that the company would then have a discretion of either a 345 kv line or a 500 kv line in this proposed route."

This motion was unanimously approved by the Siting Committee. (A record of these proceedings is on file with the Arizona Corporation Commission and available for public inspection at Phoenix, Arizona.)

This EIS has been revised since issuance of the draft and now analyzes the environmental impacts of an EHV corridor from Westwing to El Sol to Vail. The proposed corridor may eventually contain additional lines. BLM proposes to issue a right-of-way for one line at this time for either 345 kv or 500 kv. The second line, if and when it is constructed, would be 500 kv.

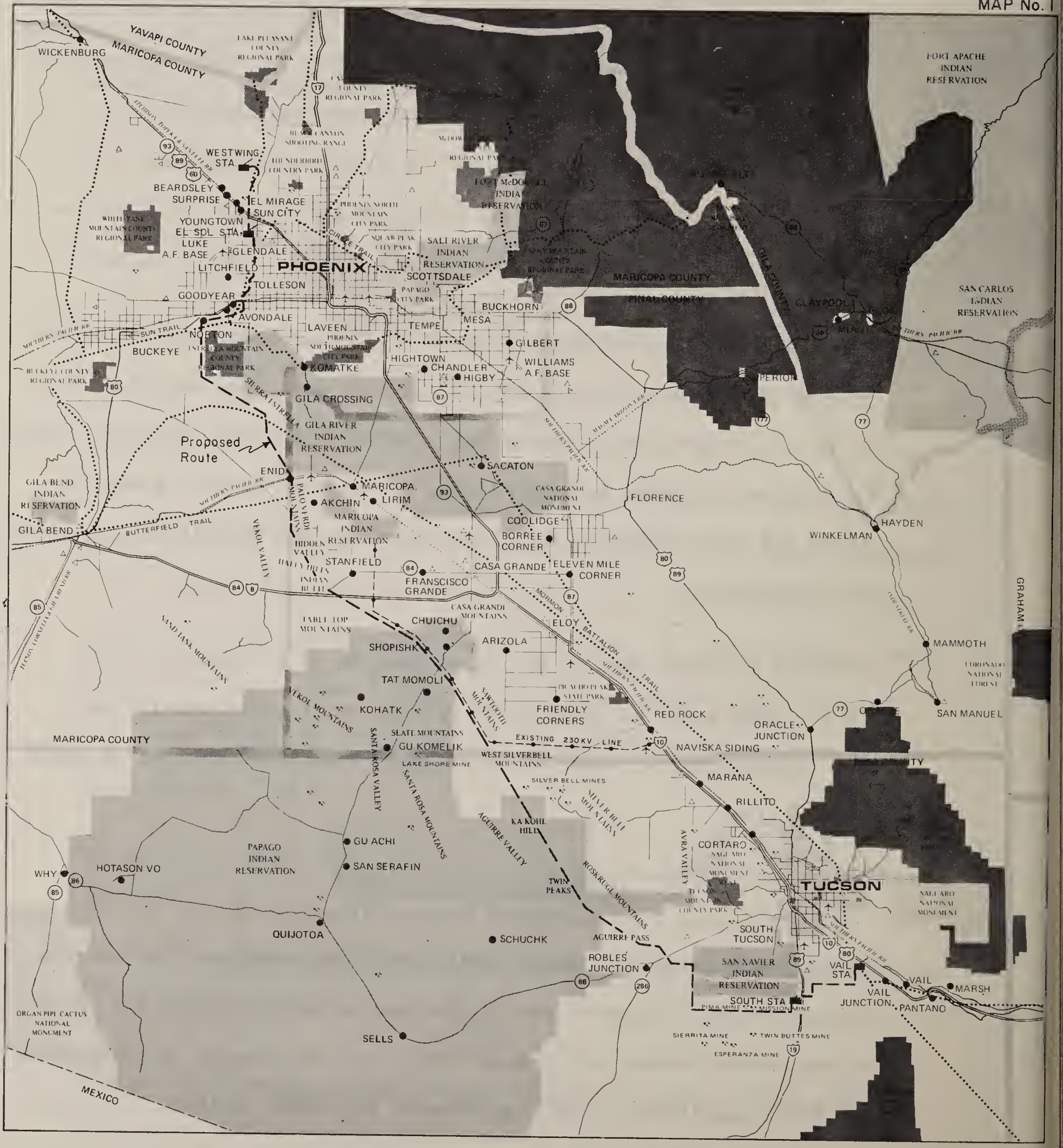
It should be noted that if the first line is to be constructed at 500 kv, TG&E would be required to operate it at considerably less than capacity for a number of years until additional sources of power come on line.

## B. INTRODUCTION AND SUMMARY

Tucson Gas & Electric Company (TG&E) has filed applications with the Bureau of Land Management and the Bureau of Indian Affairs for rights-of-way across Federal and Indian lands, for the purpose of constructing two EHV transmission lines from Phoenix to Tucson, Arizona. The proposed route is shown on Map No. 1.

# PROPOSED ROUTE FOR EHV TRANSMISSION LINE CORRIDOR

MAP No. 1



Application (A-7274) 345 kv, was filed with the Bureau of Land Management on November 17, 1972 and application (A-7872) 500 kv, on February 4, 1974, in accordance with procedures contained in Part 2850, Title 43 Code of Federal Regulations. Subpart 2851.2-1(c)(6)(i) 43 CFR requires that:

> "A detailed description of the environmental impact of the project shall be included with the application. It shall provide, among other things, information about the impact of the project on airspace, air and water quality, scenic and esthetic features; historical and archeological features, and wildlife, fish, and marine life."

Application for a right-of-way across certain Papago Indian lands was filed with the Bureau of Indian Affairs in accordance with Federal regulations contained in 25 CFR 161. Date of this application is September 11, 1973. This application requests two 345 kv lines and will probably be modified at a later date as to voltage.

Copies of the three applications are included herein as Appendix 4.

The Applicant's Environmental Analysis was prepared in conjunction with TG&E by the Environmental Systems Department of the Westinghouse Electric Corporation, Pittsburgh, Pennsylvania (Ref. 4). The environmental analysis was filed as part of the BLM application, and a copy is available for public inspection at the Office of the State Director, Bureau of Land Management, Phoenix, Arizona.

On September 22, 1972, the Secretary of the Interior determined that construction of the proposed powerlines would constitute a major Federal action affecting the quality of the environment, and that an

Environmental Impact Statement would be prepared in accordance with the National Environmental Policy Act of 1969 (Public Law 91-190). The Secretary of the Interior further designated the Bureau of Land Management as the lead agency for preparation of the environmental impact statement.

Power to be transmitted over the proposed lines will be generated at the Navajo Coal Generating Plant under construction near Page, Arizona, and will arrive in Phoenix on two 500 kv lines which are now constructed. An environmental impact statement covering the Navajo Generating Plant and associated 500 kv transmission lines was completed on February 4, 1972, by the U. S. Bureau of Reclamation (FES 72-1).

## C. ASSUMPTIONS

In order to prepare this statement, certain assumptions concerning the proposal were made:

1. Since the exact centerline of the proposed route has not been established, the analysis will include a corridor 2 miles wide.

2. The environmental impact of the proposal is being analyzed on all lands, regardless of ownership.

3. The beginning and ending points are the Westwing and Vail Substations. The portion of the line extending from the Westwing Substation to the El Sol Substation (approximately 12 miles) is discussed in the attached Environmental Analysis Record (Appendix 12) and the Westwing to El Sol Supplement (Section VI). The TG&E lines will be using the same towers and/or corridor as APS for this segment of the line.

4. For right-of-way control purposes, recommendations for stipulations and actions pertain to Indian and national resource lands under the administrative or trust jurisdiction of the Secretary of the Interior.

5. Indian lands crossed by the proposed corridor are under the control of local tribes. The tribes will reach agreement with the applicant and a right-of-way easement across the Indian trust lands will be considered by the Secretary of the Interior after obtaining the consent of the Indian landowners.

6. Measures designed to mitigate adverse environmental impacts are described throughout Section II in this statement. In order to insure that all existing laws, regulations, and stipulations are understood and complied with, there will be environmental briefings with the grantee and its contractors. Continuous on-site inspections will be made to insure compliance.

## D. BACKGROUND AND HISTORY

### Need for Power in the Tucson Area

TG&E has predicted the need for additional power supplies in the Tucson area by the summer of 1974. This prediction has been substantiated by studies and forecasts made by the Western Systems Coordinating Council and the Federal Power Commission (p. 4 Ref. 4; p. A-43 Ref. 15).

The increasing demands for power are based on increasing population, increasing per capita consumption as a result of an improved standard of living, and industrial growth associated with the mineral resource development in the Tucson area.

## Prior Power Commitments

In order to meet the projected needs for power in the Southwest, a steering committee composed of various utilities and Federal agencies was formed in 1968 (p. 4 Ref. 15), to study various alternative methods of providing power. The committee considered a number of alternative power sources before deciding in favor of a coal-fired power plant. The study concluded that:

> "1. It was doubtful there was adequate time within which to license and construct a nuclear powerplant to meet the load requirements of the participants in 1974. Other considerations which excluded nuclear plants were the additional water requirements for nuclear generation, and the delays which had been experienced by other utilities in bringing nuclear generating plants on line on their scheduled date of commercial operation.
>
> 2. Natural gas for large industrial plants is being discouraged for long-term use because of possible exhaustion of gas fields in the area.
>
> 3. Oil is expensive, and it is difficult to obtain oil with as low a sulfur content as Black Mesa coal.
>
> 4. Hydroelectric plantsites are limited both as to economy and size. Most economical sites have been developed. Development of the remaining sites has been strongly opposed due to concern about preservation of natural values.
>
> 5. Other more exotic power sources, such as the fuel cell, magnetohydrodynamics, solar generators, and geothermal, are still in the experimental stage and cannot be assured as commercial power sources for the time period stated above.
>
> 6. Coal is relatively plentiful in certain locations in the region, and its use would produce economic benefits to the State of Arizona and the Navajo and Hopi Indian Tribes.

> After an extensive investigation by ten separate task forces reporting to the steering committee, the following conclusions were reached:
>
> 1. That based upon the load growth in the area, expressions of interest of potential participants, and economic transmission system development, there was need for a 750 mw nameplate-rated unit in each of the years 1974, 1975, and 1976;
>
> 2. That the most economical alternative to supply these requirements would be the installation of three 750 mw units at a site located near Page, Arizona, which would be fueled by coal from Black Mesa coal deposits on lands leased by Peabody Coal Company from the Navajo and Hopi Indian Tribes. It was further concluded that the most economical means of transporting the coal from the Black Mesa Mine to the plantsite would be by train. Water consumption for the generating station, not to exceed 34,100 acre-feet per annum, would come from the unconsumed portion of Arizona's Upper Basin entitlement;
>
> 3. That the capacity generated by the three 750 mw units could be economically transmitted to the load centers of the utilities expressing an interest in participating in the Navajo Project over three 500 kv lines. One 500 kv line would go from the Navajo Generating Station west to the McCullough Substation located in the southern tip of the State of Nevada near Boulder City. Two 500 kv lines would go from the Navajo Generating Station south to a point in northwest Phoenix. All of the participants in the Navajo Project would then require additional transmission facilities so as to transmit their Navajo Generating Station entitlements from the termini of the 500 kv system into their respective systems;
>
> 4. That the Navajo Project offered the most economical source for supplying the power requirements of the Central Arizona Project (authorized for construction in 1968) as an alternate to hydroelectric facilities which were opposed by conservation interests."

The first unit of the Navajo Plant and the two 500 kv transmission lines to Phoenix are presently constructed. Upon completion, the generating station will have a total net capacity of 2,310,000 kilowatts. The first 770,000 kw unit went on line in May 1974; the remaining two units are scheduled for completion at 1-year intervals.

When completed, the Navajo Generating Station will be the largest generating station in Arizona.

The Navajo Plant will be the third power generating station to be constructed under the Western Energy Supply and Transmission (WEST) Associates concept in which participating utilities cooperate in extensive regional planning of generating and transmission facilities and coordinate their investment in such facilities. Generating plants much larger than any single utility would need are constructed and operated by groups of utilities achieving economies that individual participants could not otherwise experience.

The participants in the Navajo Generating Station and their percentage of participation are as follows:

| | Percentage of Participation | Kilowatts to be received (Approximate) |
|---|---|---|
| Salt River Project* | 21.7 | 501,000 |
| Los Angeles Department of Water and Power | 21.2 | 490,000 |
| Arizona Public Service Co. | 14.0 | 323,000 |
| Nevada Power Company | 11.3 | 261,000 |
| Tucson Gas & Electric Co. | 7.5 | 173,000 |
| U.S. Department of Interior, Bureau of Reclamation | 24.3 | 561,000 |

*The Salt River Project is the Project Manager for the Navajo Generating Station

The two 500 kv lines from the power plant south to Phoenix are called "The Southern Transmission System," and were constructed and will be operated and maintained by Arizona Public Service Company.

Since the Navajo Project is constructed, this statement will not consider alternative sources of power but will consider only the environmental impacts of alternate routes for transmitting power from Phoenix to Tucson.

## E. TG&E PROPOSAL

### Route Selection and Applications

After considering environmental impacts, economic, and other considerations, TG&E selected what they determined to be the best route and made application to the Bureaus of Land Management and Indian Affairs for rights-of-way across Federal and Indian lands under the jurisdiction of the Bureaus (Map No. 1).

Of a total length of about 187 miles, the proposed powerlines would cross BLM-administered lands for about 55 miles and Papago Indian lands for about 37 miles (List of BLM lands affected, Appendix 4). The 330-foot wide right-of-way would cross portions of Maricopa, Pinal, and Pima Counties, as follows:

Table 1

Route Specific Land Ownership by Political Subdivision and Jurisdiction

| Land by Political Subdivision (County) and Jurisdiction | Miles | Percent |
|---|---|---|
| Maricopa County | | |
| Private | 22.0 | 40.3 |
| State Trust | 6.7 | 12.3 |
| Bureau of Land Management | 25.9 | 47.4 |
| Total | 54.6 | 100.0 |

Table 1 (continued)

| Land by Political Subdivision (County) and Jurisdiction | Miles | Percent |
|---|---|---|
| Pinal County | | |
| Private | 9.0 | 17.8 |
| Indian Reservation | 18.7 | 37.1 |
| State Trust | 8.5 | 16.9 |
| Bureau of Land Management | 14.2 | 28.2 |
| Total | 50.4 | 100.0 |
| Pima County | | |
| Private | 25.5 | 29.9 |
| Indian Reservation | 18.5 | 23.9 |
| State Trust | 23.25 | 28.4 |
| Bureau of Land Management | 14.6 | 17.8 |
| Total | 81.85 | 100.0 |

Table 2

Summary of Land Ownership

| | Miles | Percent |
|---|---|---|
| Private | 57 | 31 |
| State Trust | 38 | 20 |
| Indian Reservation | 37 | 20 |
| Bureau of Land Management | 55 | 29 |
| Total | 187 | 100 |

### Power System Design

A delivery system consisting of poles or towers and transmission lines is required to transmit electrical power from the generating plant to the use area. To support the delivery system, a communications system is needed to provide communications between substations to regulate the amount of electricity within any portion of the delivery system. Power regulation provides for an even flow of electricity and prevents fluctuations or power surges that could damage electrical appliances or lighting systems. Such flexibility of power regulation is required to balance the varying demands for electrical power during different hours of the day and/or different seasons of the year. TG&E proposes to use four off-site microwave stations as a communication support system (p. 18 Ref. 4).

The proposed transmission line corridor considered in this statement starts at the Westwing Substation west of Phoenix and extends generally southeast to the Vail Substation south of Tucson (Map 1).

TG&E has applied for a right-of-way 330 feet in width to provide for construction of two power lines. Because of regulatory limitations (43 CFR 2850.0-3(b), a separate right-of-way application must be submitted for each transmission line for each powerline crossing BLM lands.

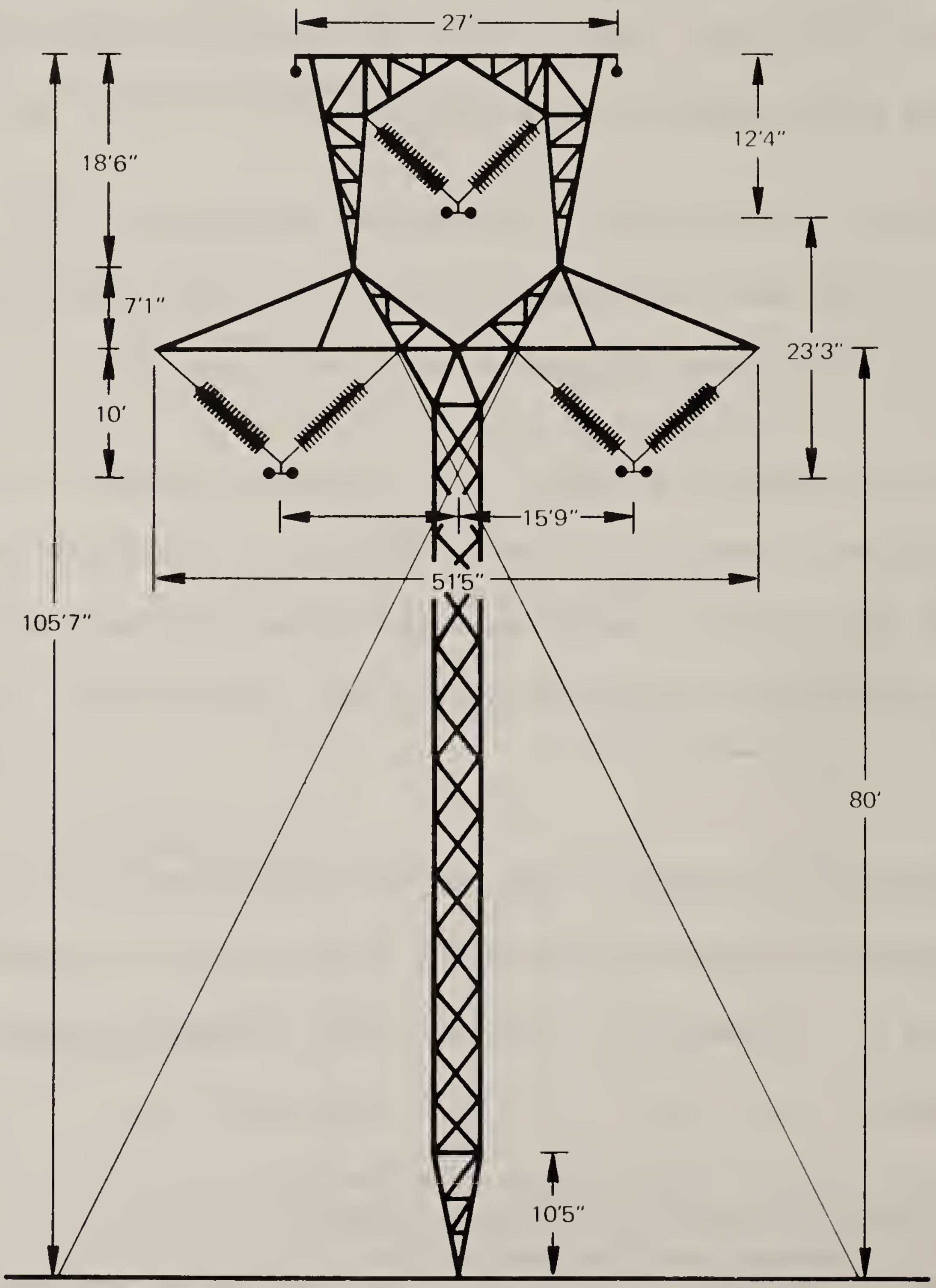
A technical description of the delivery system and the electrical transmission equipment proposed for this project is contained in Appendix 9. Schematics of typical tower designs are shown in Figures 1, 2 and 3.

### Preconstruction Survey and Design Proposal

In order to complete a final design and determine the exact line location prior to construction, it will be necessary to make a field survey of the approximate centerline of the proposed route. Application for permission to survey the right-of-way across Indian lands

## SCHEMATIC OF 345 KV TOWER DESIGN

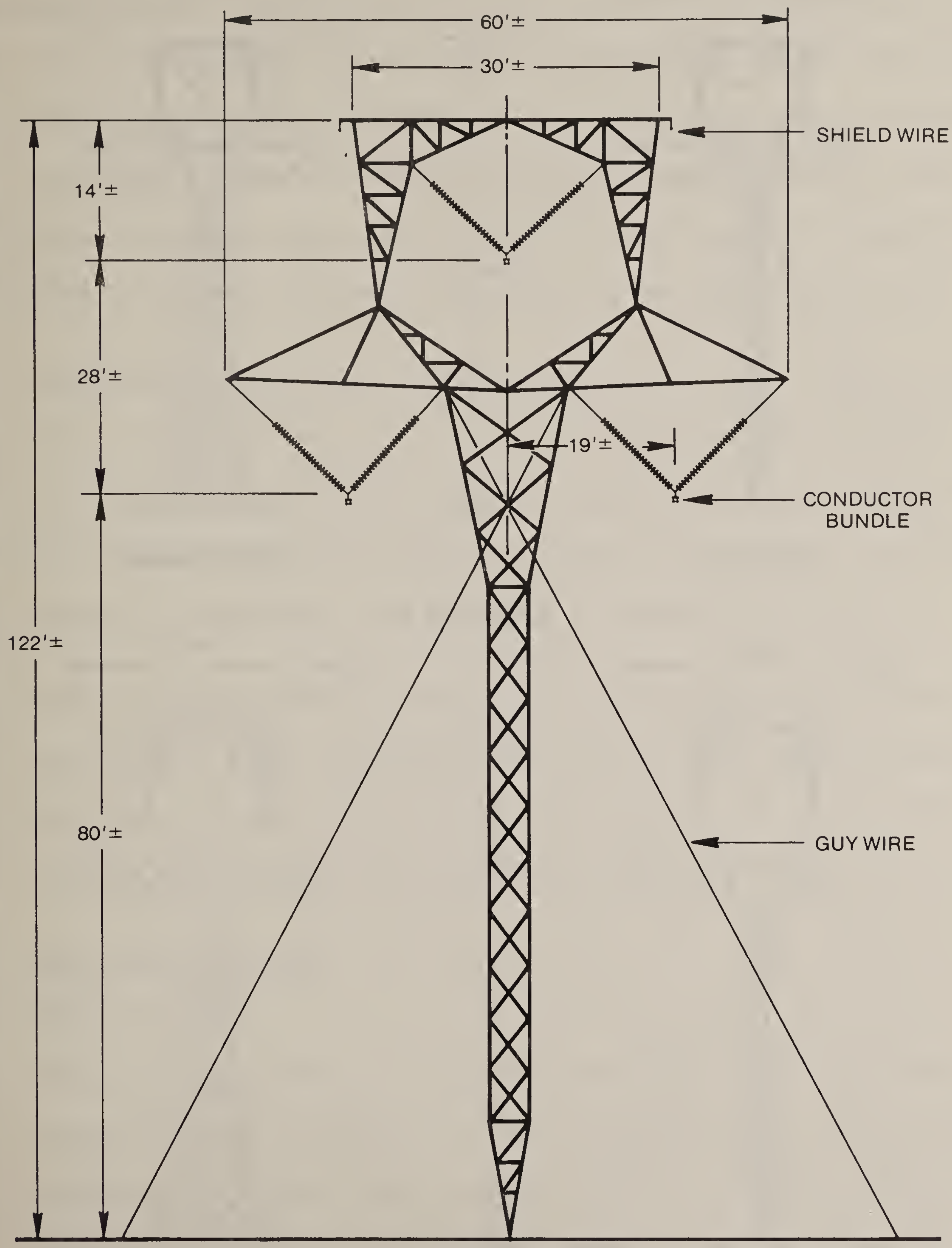
FIGURE No. I



GUYED-DELTA
SINGLE-CIRCUIT
TOWER

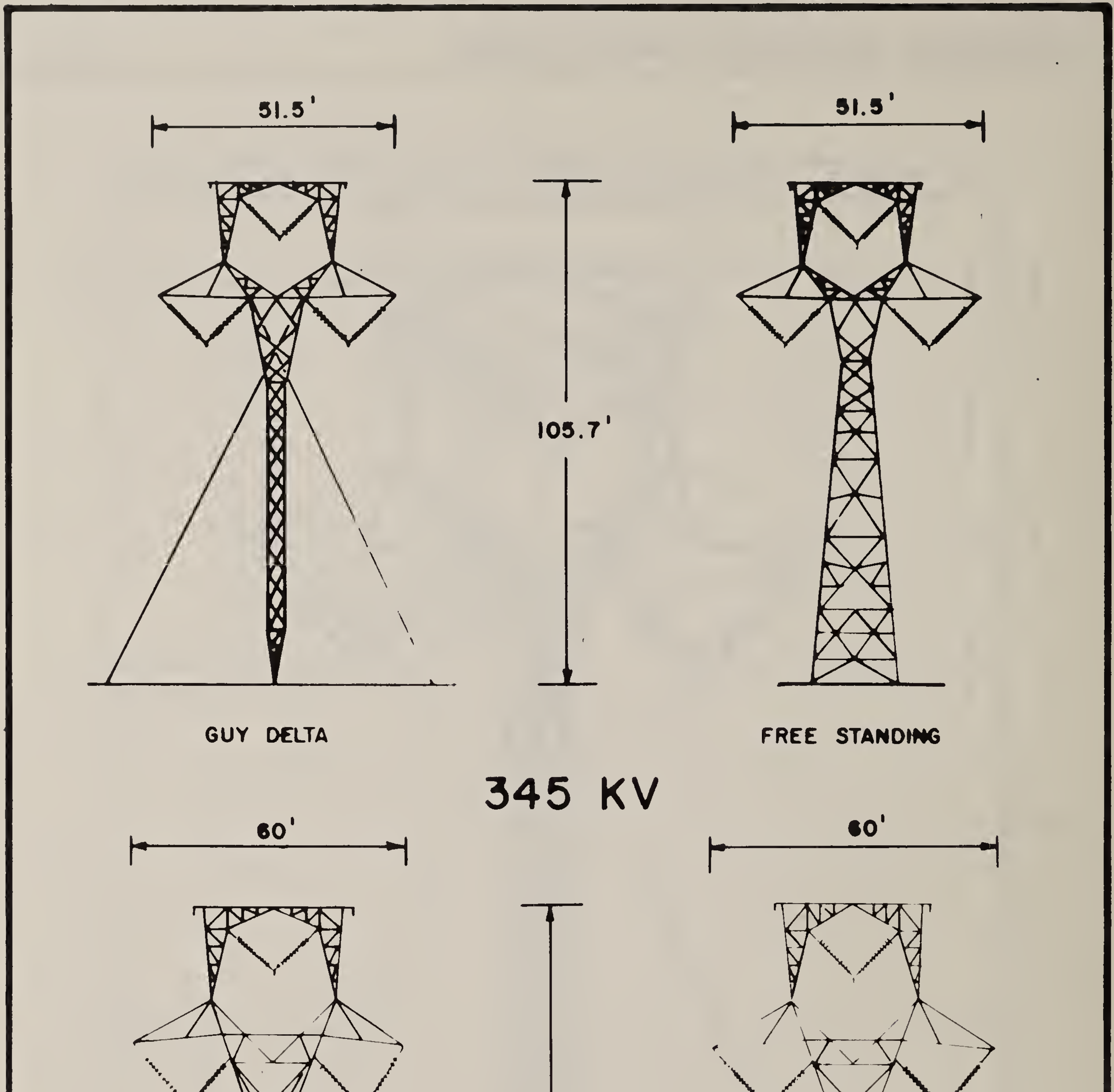
## SCHEMATIC OF 500 KV TOWER DESIGN

FIGURE No. 2



GUYED – DELTA
SINGLE – CURCUIT
TOWER

COMPARATIVE SIZES OF 345 AND 500 KV TOWERS FIGURE No. 3



will be made to the Bureau of Indian Affairs prior to entering Papago lands. Prior written consent by the Tribe is required before issuance of the permission to survey can be made. Field survey will be done by a survey crew using four-wheel drive vehicles for access along existing roads as much as possible. No roads will be constructed during this phase of activity. Only a minimum amount of vegetation would be removed to allow for operation of surveying instruments.

Approximately every 2000 feet along the line, a panel of white plastic will be placed on the ground. Distances between panels and their relationship to land survey markers will be determined by ground survey. An archeologist will accompany the survey party, and if archeological evidence is discovered, the site will be marked with a white T.

After the ground survey is completed and the panels are in place, the route will be flown and photographed from the air. Aerial photographs, with ground control shown on them, will then be used to plot the exact line and tower locations for the final powerline design.

## Construction Proposal

### Delivery System.

The actual construction of the powerline will be done by private contractors working for TG&E. In order to construct the line, men and materials must be delivered to each tower site. Present plans are to transport men and materials to tower sites by the use of ground vehicles. This necessitates the construction of roads and trails, or cross-country travel.

Construction of the delivery system will involve:

(1) Access routes to tower sites. Terrain and existing roads will dictate the type of access possibilities, i.e., whether cross country, by use of existing roads, or by constructing new access roads.

(2) Removing vegetation where tower bases and guy line anchors are to be placed.

(3) Clearing and leveling an area for a crane pad at each tower site.

(4) Providing turning areas for equipment at each tower site.

(5) Using a drilling rig to drill four holes for guy anchors at each site.

(6) Drilling an area for each tower base pad.

(7) After installing the guy line anchors and tower base pads, steel tower sections will be hauled to each tower site on trucks and assembled with a crane.

(8) The wires will then be tension strung, as described in Appendix 9. An area to operate equipment for tensioning and pulling will be needed approximately every 17,000 feet along the line.

The construction activity at each site would affect an area slightly larger than the 100' by 100' needed within the area encompassed by the guy lines.

(9) Access. - Until actual tower sites are selected, the exact numbers and types of access roads needed cannot be

determined. Access to the tower sites will be obtained using existing roads as much as possible. Where new access roads are required, non-bladed overland travel will be used as much as possible, and "bladed" roads will be constructed only as necessary.

(10) Staging Areas. - Staging areas for construction will be located at approximately 20-mile intervals, so that powerline parts will be within 10 miles of any tower site. Staging areas will range in size from 20 to 25 acres. Where cleared sites are not available, they will be prepared and left in accordance with environmental guidelines (Appendix 10). Specific sites have not been identified.

(11) Material Sites. - At the present time, a need for materials such as sand and gravel for mixing concrete, or fill material for road construction or landscaping has not been identified by TG&E.

Depending upon the physical characteristics of the site, from 4 to 30 cubic yards of concrete per tower may be required. This relatively small volume may be obtained from existing local supplies or from lands along the route, either private or public. No applications have been filed for the removal of materials from public lands along the route. Permits issued by the Papago Tribe will be obtained prior to removal of sand and gravel materials from Indian lands.

### Communications System

TG&E will require four off-site microwave stations to insure safe reliable operation of the lines. Three of the proposed sites will be on national resource lands and are the subjects of separate applications. Microwave communication sites will be located on mountain tops at quite some distance from the transmission lines. Each site will require a ground access route and electrical service. The general location of the microwave system is shown on Map 2.

In order to minimize the environmental impacts created by access roads and construction work, TG&E will require contractors to comply with established environmental guidelines (Ref. 4, Sec. 6.2) in all aspects of construction.

## Operation and Maintenance Proposal

### Delivery System

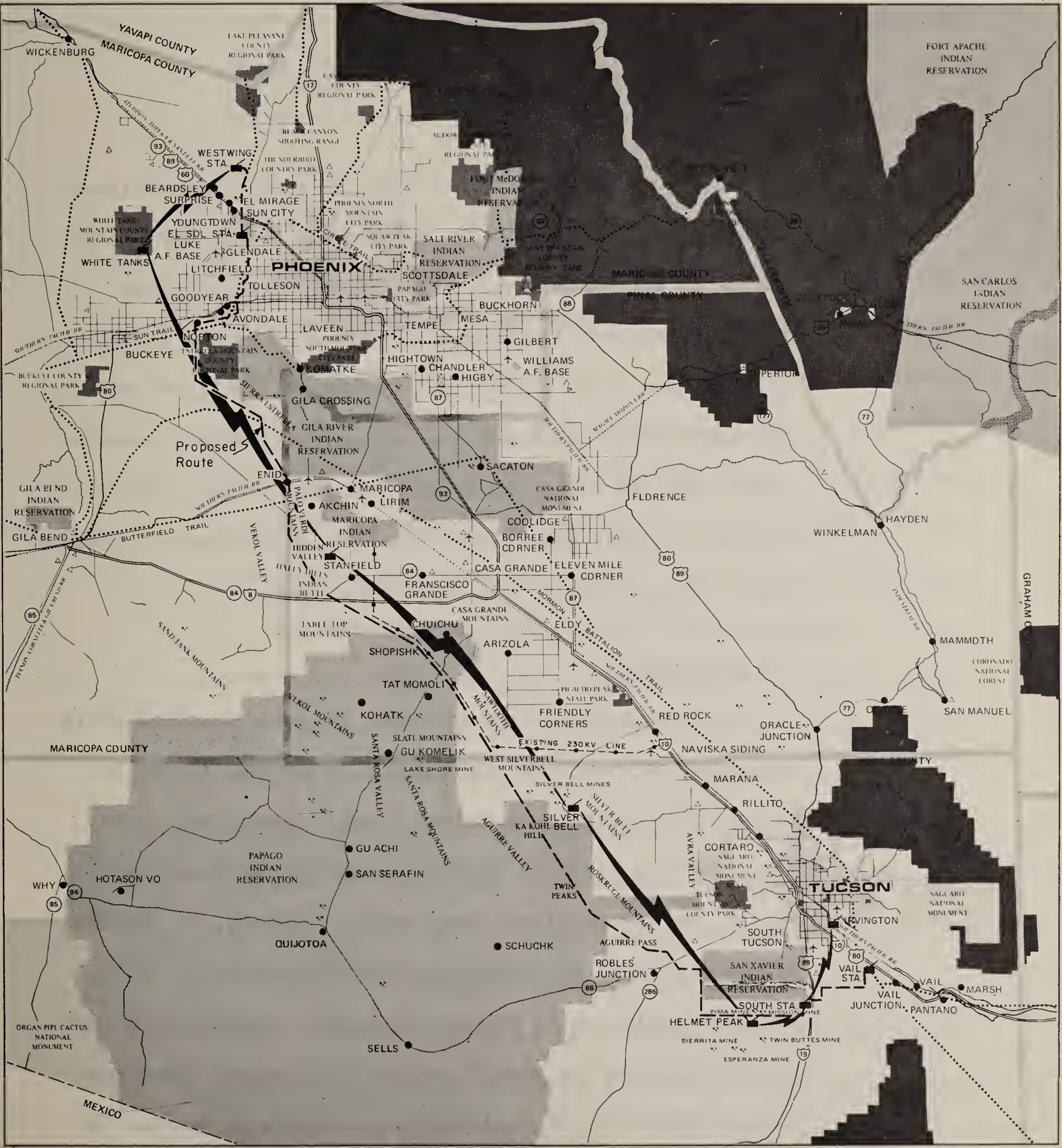
Once the transmission line is installed, it will be patrolled by the use of aircraft to determine any possible maintenance needs. If problems are located, such as broken insulators or wires, it will be necessary to bring crews in by ground vehicle to repair the damage.

### Communications System

Communications sites will be accessible by road. Servicing and maintenance will be accomplished by surface travel to each site. No microwave stations will be located on Indian lands.

## MICROWAVE COMMUNICATION SYSTEM ALONG PROPOSED ROUTE

MAP No. 2



# II - ENVIRONMENTAL IMPACT ANALYSIS

## A. NON-LIVING COMPONENTS

### 1. Land

a. Description of the existing environment:

(1) Physical Setting.

The lands under consideration for this proposed transmission line are located in the Sonoran Desert section of the Basin and Range province in South Central Arizona. This general area is bounded on the north by the Hieroglyphic Mountains; on the east by the metropolitan areas of Phoenix and Tucson and the agricultural areas lying between them; on the south by the Twin Buttes mine; and on the west by vast undeveloped expanses of northwest to southeast trending valleys and mountain ranges.

(2) Topography.

The topography of the proposed transmission line route beginning at the El Sol Substation is characteristic of river flood plain terraces and river channel that border the Agua Fria River as it flows from the mountains to the north. As the corridor proceeds to the south, it follows the Agua Fria River features through agricultural lands that are beginning to experience spotty residential growth moving out from the Phoenix metropolitan area. An exception is along the west edge of Sun City where the routing is within a few hundred feet of this heavily urbanized area. After crossing U. S. Highway 80, the proposed route bears west through the Buckeye Valley agricultural lands generally lying north of and paralleling the Gila River. Upon crossing the Gila River near Norton, the corridor goes directly south on the alluvial outwash from the Estrella Mountains and parallel to and a short distance west of the Estrella Mountain County Regional Park boundary. Near the southwest corner of the Estrella Mountain Park, the route swings to the southeast and continues across the alluvial fan originating from the Estrella Mountains. Halfway along the Estrella range a more southerly route is taken to the west of the Palo Verde Mountains. The line will then bear to the southeast and pass through the Haley Hills which are deep seated mountains protruding slightly from deep valley alluvial materials. The corridor continues across slightly sloping alluvial plains, meets and parallels an existing 230 kv transmission line between the Silver Reef Mountains and the Tat Momoli Mountains roughly along Silver Reef Wash, and then traverses the sloping alluvial outwash plains from the series of mountain ranges lying directly to the east. A more easterly course is taken through Aguirre Pass, with the corridor extending across a broadly undulating alluvial valley to the Vail Substation.

U. S. GEOLOGICAL SURVEY
MENLO PARK
FEB 2 [illegible]
LIBRARY

Elevations range from about 1100 feet at El Sol Substation to about 2950 feet at the Vail Substation.

(3) Climate.

The proposed corridor is located in the arid Sonoran Desert of the southwestern United States. Climate is characterized by long hot summers, short mild winters, low annual rainfall, low relative humidity, high evaporation rates, and a high percentage of days of possible sunshine.

There are two distinct moisture sources. Winter precipitation is associated with moisture moving into the area from the Pacific Ocean, while the Gulf of Mexico supplies moist air for most of the area's summer rains. Winter rains, sometimes lasting for several days, usually occur as gentle showers over a large area. Local summer thunderstorms, which usually cover only small areas, are usually of high intensity and of short duration and produce many of the destructive flash floods well known in the Southwest.

The mean annual precipitation varies from about 7½ inches at Phoenix, to 11 inches at Tucson. In the corridor area, snow is rare and melts quickly. Rainstorms may occur throughout the year in the desert and foothill sections, but are more frequent from July through September and again from December through March.

Temperatures show some variability over the area, depending mostly on elevation. The summer season begins about mid-May and ends in October. Maximum readings in excess of 100° F. are the rule during most of this period. Winter temperatures in the low desert typically reach daily maximums in the mid sixties to low seventies. Sunshine and clear skies are dominant with possible sunshine occurring about 85 percent of the daylight hours. The predominantly clear skies and characteristically dry atmosphere permit intense surface heating during the day and active radiational cooling at night. This produces diurnal temperature variations averaging 30° F. and may sometimes exceed 40° F. Mean annual temperatures typical of the area are 69° F. at Phoenix and 68° F. at Tucson. Frost-free periods vary from about 240 to over 300 days.

### (4) Geology.

The area is typical Basin and Range topography containing numerous small fault-block mountain ranges separated or surrounded by alluvium filled basins. The mountains are composed of granite, metamorphic rocks, volcanic rocks, and minor amounts of older basin deposits. The basins, which can be thousands of feet deep, are largely filled with uncemented and cemented mixtures of gravel, sand, and clay washed from the adjacent ranges. In some areas, the deposits include volcanic rocks, and some basins contain subsurface beds of salt or other evaporites precipitated from ancient saline lakes.

Quaternary gravels, sands, and silts cover the greater part of the surface of the lands traversed by the corridor. The exposed outcropping rocks bordering the northern part of the corridor are of Precambrian age and are mostly granites, granitic gneisses, and altered volcanics. Where the corridor crosses State Route 84, bedrock begins changing to a Cretaceous and Tertiary intrusive and extrusive rock varying from basalts to rhyolites. Farther south in the Santa Rosa Mountains, the Silverbell Mountains, and the Tucson Mountains, there is a great deal of Cretaceous sedimentary rock interbedded and intruded by the volcanic materials. The Vail termination point is on Quaternary sands and gravels (Ref. 1).

Within central Arizona there is land subsidence related to water level declines caused by large scale ground water pumpage for irrigation and municipal uses. Pumpage in excess of recharge has caused steady declines in ground-water levels throughout the project area. For the period 1923 to 1964, maximum ground-water level declines of over 300 feet were recorded near Stanfield and Mesa. Near Eloy a decline of 200 feet was noted. The point of maximum documented subsidence in the project area occurs to the northwest of Eloy, where the land subsided 7.5 feet during the period 1948 to 1967. Data from the cooperative U.S. Geological Survey - Bureau of Reclamation subsidence program recorded subsidence amounts of 1.0 foot, 0.4 foot, and 2.2 feet from the spring of 1965 to December 1971 in the Eloy, Chandler Heights, and Luke Air Force Base areas, respectively.

Land subsidence is a topographic phenomenon which is usually caused by the rapid extraction of fluid substances (oil or water) from beneath the earth's surface. Spaces left by the extraction are filled by compaction of subsurface materials, causing a settling of the surface. The maximum amount of subsidence will occur in heavily pumped areas of a basin, creating differential subsidence between these areas and the peripheral basin areas. This creates the peripheral area cracks, or earth fissures, which are commonly associated with such subsidence.

Earth fissures and associated differential subsidence have damaged irrigation systems, interstate highways, and railroads. Earth fissures have damaged Picacho Reservoir, while differential settlement across Interstate Highway 10, near Picacho, necessitates continued maintenance (Ref. 14).

Studies reveal that earthquakes in southcentral Arizona are infrequent and that recorded tremors are of a low magnitude. The Sonoran Desert is a seismically stable area. Seismic events that have shaken the area originated from out-of-State, either in California or Mexico. (Ref. 4.)

(5) Hydrology.

The deep alluvium filled valleys of this area contain extensive underground reservoirs and aquifers which are used to provide water for agricultural, mining, and urban needs. These large underground water reservoirs were created by the block faulting of the basement rocks and the filling of the troughs with porous unconsolidated sedimentary materials. Subsequent tectonic activity, erosional activity, and vulcanism continued the valley filling process. At present, only the Santa Cruz Basin at the south of the proposed corridor has not experienced a serious drop in the water table. Elsewhere around the proposed corridor, mining of ground water is common and is evidenced by the subsidence discussed in the previous part. (Ref. 4.)

(6) Soils.

Most of the soils have developed from alluvial materials derived from igneous and sedimentary rocks. Many soils in the basins and valleys are deep, level to nearly level, and have textures favorable both to water entrance and soil workability. The soils on the mountains are very shallow to moderately deep, are on steep to very steep slopes, and generally have loamy to clayey textures. In places these soils are stony or rocky.

The corridor area contains much potentially irrigable land. Yearlong growing seasons are common and all crops are grown under irrigation. The mountainous areas are steep and have little vegetal cover. The soils in the gently sloping alluvium filled valleys are deep, quite heterogeneous in texture and have smooth to gently undulating topography. The soils are quite low in organic material and have not been leached of soil nutrients.

The soils in the corridor area are commonly affected by the precipitation of salts produced by weathering of rock-forming minerals and brought in by surface runoff. Since the seepage from rainfall is usually not sufficient to carry the salts down to the water table, they accumulate in the soil as the water evaporates. The effects are most noticeable near mountains of calcium-bearing rocks, where alluvial deposits are commonly cemented by calcium carbonate into a concrete-like material called caliche. Farther down the basin slopes, calcium carbonate content decreases, but soluble alkali salts detrimental to agriculture are still present (Ref. 14, pp. 48-49).

### (7) Land Use.

The most intensive land uses along the proposed corridor are in that part lying between the Westwing Substation and a point where the corridor begins to parallel the Estrella Mountain County Regional Park. This part of the route is already occupied by a 230 kv transmission line. Before leaving the Agua Fria River channel, the existing line is located on the river levee, on the river banks, and in the river bottom. Also located in the river flood plains and channel are several sand and gravel operations that serve the construction industry of the metropolitan Phoenix area.

The proposed El Sol Substation is located approximately one-half mile from the southwest edge of the residentially developed Sun City. Other residential development along this part of the corridor is in association with farmsteads and the small communities or development that exist along U.S. Route 80. Occasional random small residential developments lie within the influence zone of the corridor.

Irrigated agriculture is the most intensive single land use found in this portion of the corridor. Cotton, wheat, barley, safflower, sugar beets, and vegetables are the main crops. Surface water from the Salt River Project is used in this area.

Transmission lines will pass over or parallel a great number of roads, canals, and other utility distribution facilities as the corridor passes through the developed area along the western edge of Phoenix. As the corridor turns southward along the western edge of the Estrella Mountain County Regional Park, land use changes to one of recreation and livestock grazing. The western edge of the park is not intensively developed, and the use is more extensive than intensive.

South of the park the corridor traverses ephemeral (annual) rangelands that have an estimated capacity to support one to three cows for one year per section of land. Grazing use is restrained by the erratic amount of seasonal rainfall.

A small agricultural area located in Hidden Valley is crossed that lies just west of a much larger cultivated area. From Hidden Valley, the corridor continues southward through an area that has been subdivided into parcels of about 40 acres and larger for speculative holding. These subdivisions terminate at the crossing of Interstate 8.

South of I-8, through the Papago Indian Reservation and across Altar Valley, the proposed corridor is sited in predominately grazing lands. Widely scattered residences, ranch outbuildings, and mining improvements lie various distances from the influence of the corridor. For approximately 27 miles in this segment, the existing 230 kv Arizona Public Service line will be paralleled.

After passing south of the San Xavier Indian Reservation between two open pit copper mines, the corridor goes north to the South Substation. Then it enters an agricultural zone and the accompanying residential use flanking both sides of Interstate 19. Continuing easterly, the trend appears to be toward heavy industrial use which is bounded on the northeast by

Interstate 10. Ranching appears to be fading rapidly in this area lying just south of Tucson.

b. Environmental impact of the proposed action:

(1) Physical Setting.

The establishment of this transmission line corridor will not materially change the broad physical features that make up the physical setting in this corridor area.

(2) Topography.

Topographic changes will be minimal and restricted to road construction on slopes or rocky areas. Tower sites require only foundation holes, but a small pad will be necessary for a crane site during the erection of each tower. Since the communication system will utilize existing microwave sites, there will be very little road building and pad preparation for the four microwave sites. Areas to conduct tension stringing operations will require about 200 feet square at intervals of 17,000 feet, which will not modify topography.

(3) Climate.

There is no expected impact on the climate even though the passage of energy through the conductors is known to generate heat.

(4) Geology.

This proposed use will not alter any of the natural geological forces in the corridor area.

(5) Hydrology.

This proposed use may occasionally alter the watershed runoff where road construction blocks natural runoff paths. There should be no impact on the movement of ground water in the transmission line corridor. Hydrology of the area will not be significantly affected.

(6) Soils.

There will be some impact on soils during the clearing and construction phases of this project. The routine vehicular traffic on the right-of-way will leave varying depths of tire impressions where workers park their cars and construction equipment maneuvers in constructing the line. Without mitigating action, these depressions may become future avenues of runoff, sources of sediment, and may lead to gulley formation during high intensity storms.

Soil movement will be stimulated in road construction and clearing even though environmental protection measures will be utilized. The desert soils involved are fine to gravelly textured, unconsolidated, and are susceptible to both wind and water erosion. Until construction is completed and the rehabilitation measures are taken, there will be soil movement. After construction, repair and maintenance on the lines and the use of the roads by others could continue to cause wind and water erosion along the corridor.

Minimum soil disturbance will occur in construction of the communication sites, since the areas already contain access roads, and two of the three sites on national resource lands contain an existing microwave station and a concrete pad from a previous site. The third site will experience soil leveling for site construction. Impacts are minimum and are not significant, compared to establishing new sites.

Except for the major access routes to the transmission line corridor, the impact on soils will be essentially the same for a second line as for the initial line.

Any campsites and equipment storage areas will contribute to both wind and water erosion until rehabilitation efforts take effect. No campsites have been identified for establishment on national resource lands.

### (7) Land Use

The corridor will have varying effects on land uses that now exist within the corridor or within the influence of the corridor.

Since a part of this corridor is in the westerly growth zone of the Phoenix metropolitan area, it will have some impact upon the residential and industrial development found there. Industry, as a rule, does not object to being located in or bordering on massive utility facilities. Homeowners, on the other hand, often voice objection to being close to large power transmission structures. Sun City has been developed quite close to the existing 230 kv line along the Agua Fria River bed, and people still seem willing to purchase homes quite close to the structures. Although many people say they will not live next to this kind of use (powerline corridor), apparently there are many who do not object and who do not feel that the corridor has any degrading effect on the value of their properties.

There are certain adverse electromagnetic effects that extra high voltage lines have on adjacent activities. In the northern segment of the corridor between Sun City and Estrella Mountain County Park, there is a concentration of road crossings where auto radio reception interference will exist.

There exists the possibility that dielectric gaps could occur between conducting parts in the electric field that would cause television interference effects. The applicant states that "all metal-to-metal contacts in the electric field of the transmission line will be provided with a good electrical bond to eliminate gaps," and, "any potential sources of television interference effects existing in the powerline corridor will be eliminated." (Ref. 4, p. 90).

The two above conditions would have less impact in the southern more remote segment of the corridor.

Within the Agua Fria River channel and under the influence of the corridor are several sand and gravel operations. There does not appear to be any conflict between these two uses. Both can be carried out simultaneously with minimum conflict. Since the river is intermittent, the corridor should not affect any aquatic life.

There is a definite impact on agricultural use where the corridor crosses agricultural lands. Self supported towers will be used on privately owned agricultural lands. The corridor will cross about 4 miles of crop lands south of Avondale and about 1 mile of agricultural lands lying on each side of U. S. Route 89 south of Tucson. If towers are spaced every 1200 feet, an estimated 20 towers will be occupying agricultural lands with a loss of about 4½ acres of productive land.

TG&E estimates that 1.2 miles of 14-foot wide access road will be required for each mile of transmission line corridor, which accounts for a loss of about 10 acres from production. There will be a loss of production during construction, since construction vehicles and supplies must move along access roads to tower sites.

There will be a very small reduction in the amount of natural feed available for livestock grazing in the corridor. About 5 miles of the 187-mile corridor are taken up in agriculture and the remaining lands have been traditionally used for livestock grazing. The company estimates that about 320 acres will be disturbed in the construction of the initial line. It will take about 15 years to restore the disturbed vegetation. Therefore it appears that over the 15-year recovery period the feed lost would have supported eight cows on a yearlong basis. This amount of forage loss is not likely to have an impact upon any livestock operator.

This corridor will parallel other existing lines along part of the route. At this time it does not appear that there will be a conflict of lines or corridors. Map No. 3 shows the transmission lines now in place and the location of this proposed line. Map No. 4 indicates the proposed transmission lines that will be needed by 1990 (Ref. 13). It may be necessary, for the purpose of limiting the impact of corridors in the future, that the major power companies integrate their transmission and distribution systems.

Construction activity and the associated human use of the construction zone will have the most potential for adverse impact upon the land as a basic resource. Conflicts of land use do exist and will be outlined in sections on human use of the area, hazards to human and animal health and safety, aesthetics, and human interest values. Impacts upon the land resource can and will be mitigated to a level that is considered acceptable.

c. Mitigating measures included in the proposal:

The Environmental Analysis prepared by Environmental Systems of Westinghouse Electric Corporation for TG&E states that corridor routing mitigation was considered, based on the desires of landowners and governmental agencies. A detailed evaluation of the alternative routes is contained in the section on Alternatives. Map No. 5 indicates the alternative routes that were considered. The environmental analysis reports (Ref. 4, p. 7):

> "TGE has evaluated at least nine basic route possibilities between Phoenix and Tucson with numerous variations of these basic routes. These were plotted on topographic maps, subjected to preliminary environmental analyses and discussed with the various landowners. Constraints that appeared as a result of these analyses eliminated some route possibilities from further consideration and served to narrow the corridor options."

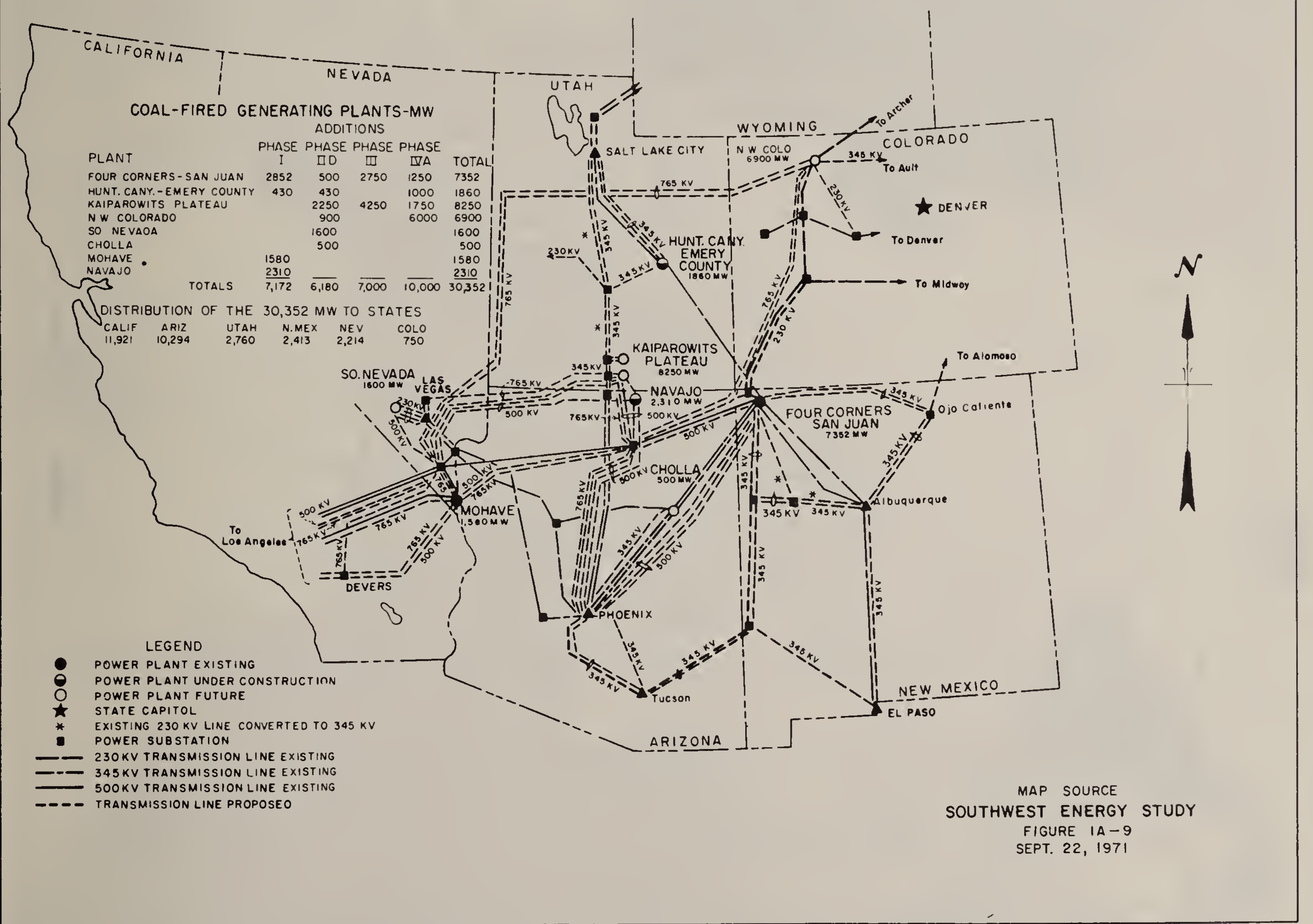
TG&E's guidelines to minimize environmental impact upon the corridor are reproduced in Appendix 10. The guidelines propose to minimize route selection conflicts and to minimize construction damages.

d. Additional mitigating measures to be included:

The Department of the Interior (hereafter referred to as the Department) will make the stipulations set out in Appendix 6 of this environmental statement a part of the right-of-way grant, should favorable

# EXISTING AND PROPOSED TRANSMISSION LINES

MAP No. 3



COAL-FIRED GENERATING PLANTS-MW

| PLANT | PHASE I | PHASE II D | PHASE III | PHASE IV A | TOTAL |
|---|---|---|---|---|---|
| | ADDITIONS | | | | |
| FOUR CORNERS-SAN JUAN | 2852 | 500 | 2750 | 1250 | 7352 |
| HUNT. CANY.-EMERY COUNTY | 430 | 430 | | 1000 | 1860 |
| KAIPAROWITS PLATEAU | | 2250 | 4250 | 1750 | 8250 |
| N W COLORADO | | 900 | | 6000 | 6900 |
| SO NEVADA | | 1600 | | | 1600 |
| CHOLLA | | 500 | | | 500 |
| MOHAVE | 1580 | | | | 1580 |
| NAVAJO | 2310 | | | | 2310 |
| TOTALS | 7,172 | 6,180 | 7,000 | 10,000 | 30,352 |

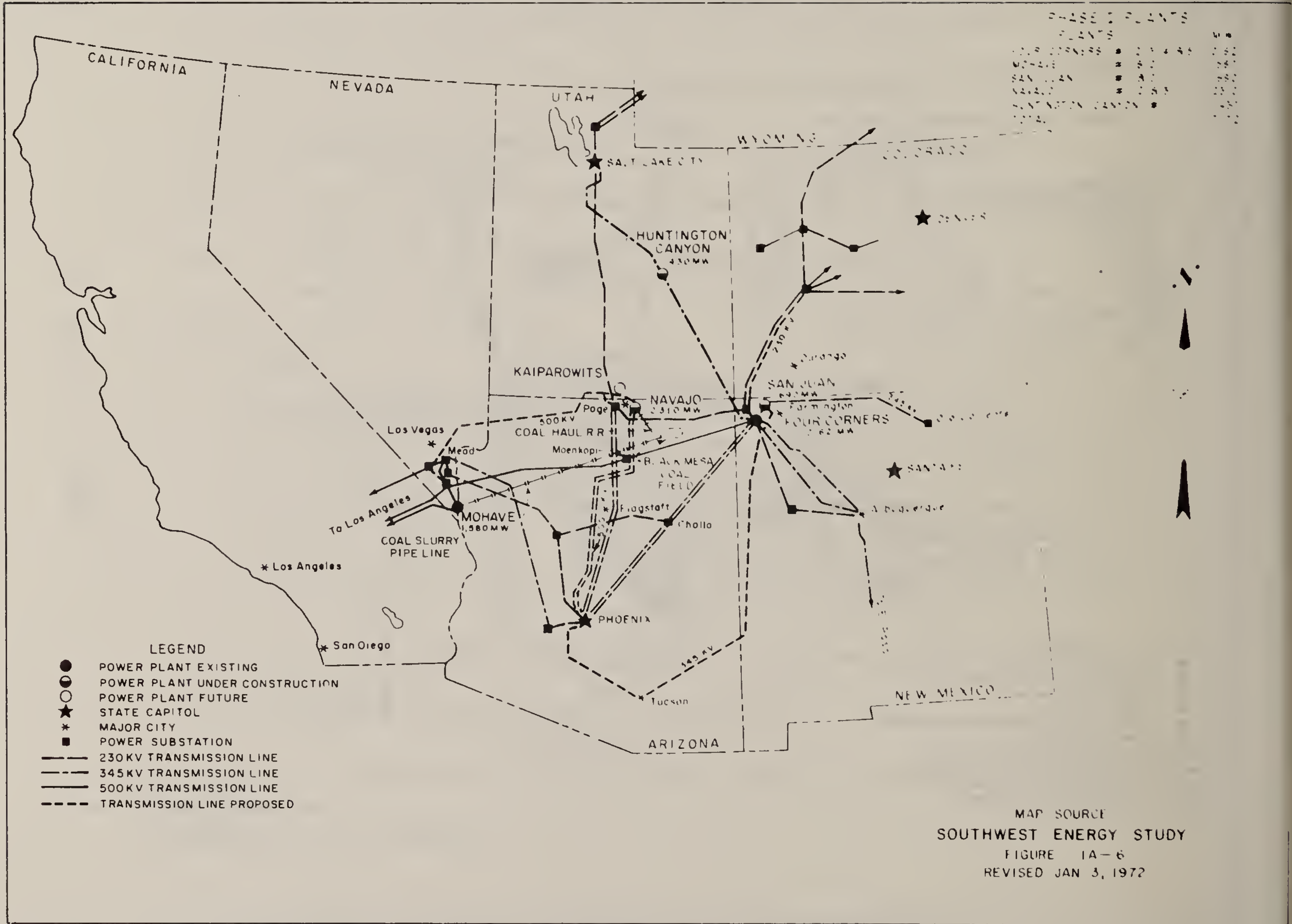
DISTRIBUTION OF THE 30,352 MW TO STATES

| CALIF | ARIZ | UTAH | N.MEX | NEV | COLO |
|---|---|---|---|---|---|
| 11,921 | 10,294 | 2,760 | 2,413 | 2,214 | 750 |

MAP SOURCE
SOUTHWEST ENERGY STUDY
FIGURE IA-9
SEPT. 22, 1971

## PROPOSED TRANSMISSION LINES NEEDED BY 1990

MAP NO 4

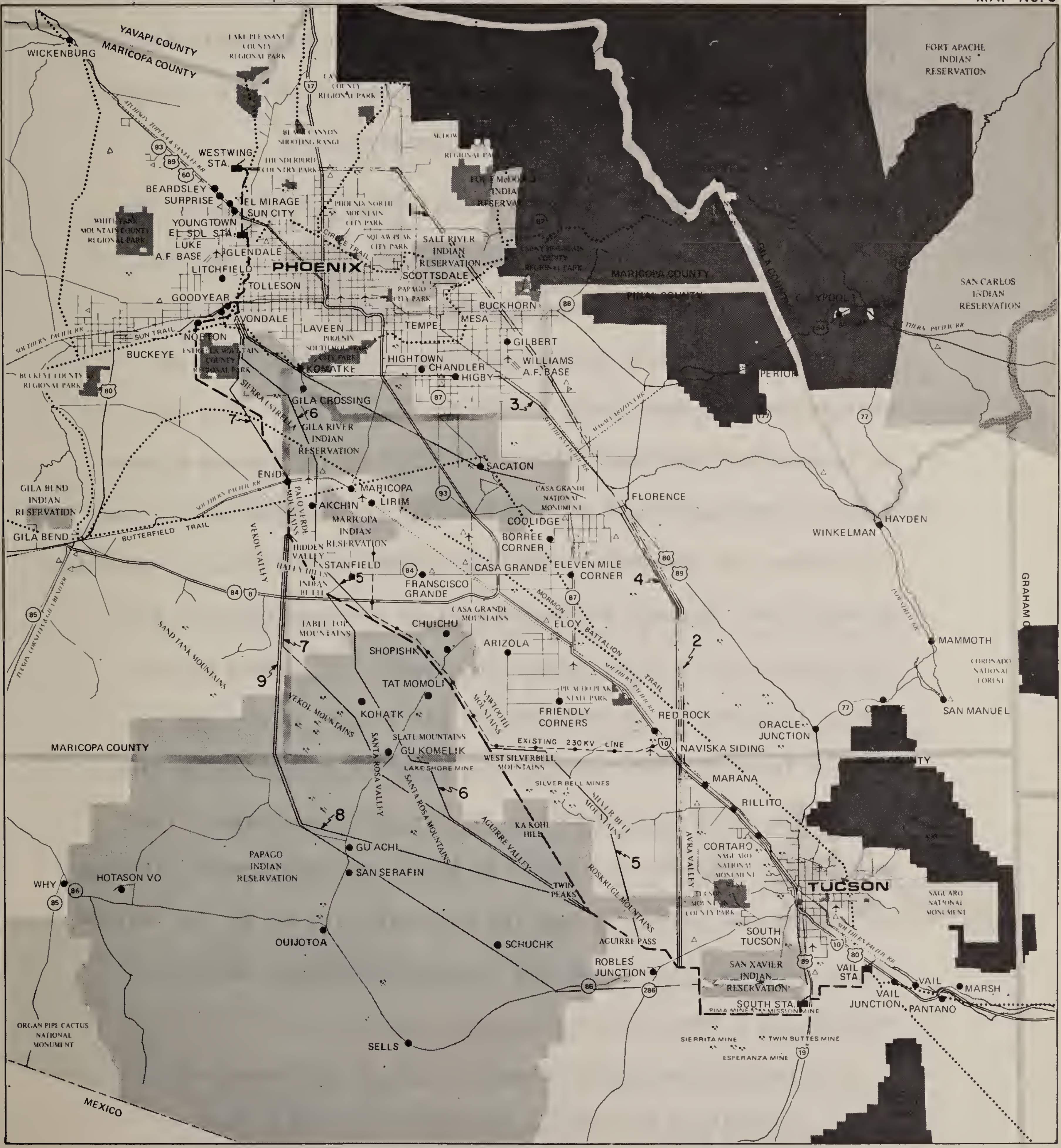


MAP SOURCE
SOUTHWEST ENERGY STUDY
FIGURE IA-6
REVISED JAN 3, 1972

# ALTERNATE ROUTES CONSIDERED

---- Proposed Route   ↙2 - Numbered Alternate Route

MAP No. 5



action be taken upon the application. The Department also proposes to include in the permit that a surety bond or other security must be furnished to the United States in the amount of $100,000 for each line and that such bond shall remain in effect until the proposed transmission line is completed and the bond or security is released by the Secretary of the Interior.

The purpose of the bond or security is to (1) insure the performance of the applicant and its contractors under the terms and conditions of the right-of-way grant; (2) provide for immediate payment to the United States of any cost or obligation incurred by the United States in performing any obligation of TG&E which in the judgment of the United States TG&E or its contractors have not performed satisfactorily; and (3) ensure the payment, within the amount of the bond or security, of any final judgment recovered against the applicant or its contractors for loss or damage to property of others or for bodily injuries to or the death of any person in any way arising from or connected with the proposed transmission line.

By the terms and conditions of the proposed permit, for both Indian and national resource lands, the Department, through its authorized officer, reserves the authority to do the following to protect both human and natural resources, the public interest, and the environment:

(1) Inspect the onsite construction and maintenance activities of TG&E in connection with the line. Officials of State or other Federal agencies may

inspect such activities in the performance of their official duties which relate to the line.

(2) Call upon TG&E at any time for any or all data related to preconstruction, construction and maintenance activities undertaken in connection with the line.

(3) Modify the line within the terms of the grant, to protect unforeseen extraordinary resource values.

(4) Suspend construction or maintenance activity.

(5) Disapprove construction or maintenance activities which do not conform to technical and descriptive data heretofore submitted to the Department.

(6) Revise or amend the terms and conditions of the permit where unforeseen conditions arise.

Additional mitigating requirements that are included in the terms and conditions to be made a part of the proposed right-of-way grant, over and above the guidelines established by the applicant, are as follows:

(1) Grantee shall construct and maintain the line in conformity with the descriptive and technical data heretofore furnished the Department in connection with its application for the line. Construction or maintenance activities which are not in substantial accord with such data may not be initiated without the prior written approval of the Authorized Officer. Approval of substantial variances

will not be given unless the need therefor is fully justified by Grantee.

(2) Unforeseen conditions arising during the term of this grant may make it necessary to revise or amend these terms and conditions to protect the environment and the public interest. In that event, Grantee and the Authorized Officer shall agree as to what revisions or amendments shall be made. If they are unable to agree, the Secretary of the Interior shall have final authority to determine the matter.

(3) Grantee shall provide for the protection and enhancement of aesthetic values in the planning, construction and maintenance of the line. Tower and support facilities will have dull or nonreflective finishes that harmonize with their natural setting or are otherwise appropriate. Nonreflective conductor cable will be used where the conductors are exposed to frequent public view. The Authorized Officer may require any additional reasonable measures he deems necessary to protect the aesthetic values in critical areas.

(4) Prior to construction, Grantee shall make a survey and inventory of archaeological, paleontological, and historical sites within the area to be occupied by the right-of-way and the access roads. The results of this survey will be provided to the Authorized

Officer. The Authorized Officer or the Papago Tribe may require Grantee to relocate the proposed transmission line facilities in order to avoid destruction of archeological, paleontological, or historic values or to delay construction until salvage operations are completed. All costs of inventory, survey and salvage operations will be borne by Grantee. All salvage shall remain the property of the United States unless located on Indian lands. Salvage material located on Indian lands shall remain the property of the Papago Tribe.

(5) In all its operations under this grant, Grantee shall comply with all applicable Federal, State, and local laws and regulations concerning use of poisonous substances, including but not limited to insecticides, herbicides, fungicides, and rodenticides. Grantee shall prepare a written plan of use of such substances which must be approved by the Authorized Officer before such substances may be used by Grantee on or near the right-of-way. The plan shall state the type and quantity of material to be used, the pest to be controlled, the method of application and such other information as the Authorized Officer may require. All use of such substances on or near the right-of-way shall be in accordance with the approved plan. If the use of a poison is prohibited by the Secretary of the Interior, it shall not be used. If use of a poison is limited by the Secretary of the Interior, it shall be used only in accordance with that limitation.

(6) Grantee shall remove or dispose of all waste in a manner consistent with Federal, State, and local laws and regulations. The term "waste" as used herein means all discarded matter, including but not limited to human waste, trash, garbage, refuse, oil drums, petroleum products, ashes, and equipment.

(7) During construction, Grantee shall regulate public access and vehicular traffic as required to facilitate construction operations and to protect the public, wildlife, and livestock from hazards associated with the project. For this purpose, Grantee shall provide warnings, flag men, barricades and other safety measures. Grantee will be responsible for providing and installing caution and regulatory signs that are necessary for the safety of users of access roads.

(8) Upon revocation or relinquishment of the right-of-way grant, unless the requirement is waived in writing, Grantee shall, so far as it is reasonably possible to do so, restore the land to its original condition to the satisfaction of the Authorized Officer.

e. Unavoidable adverse effects:

Unavoidable land-use adverse environmental effects will take the following forms:

(1) The placement of this corridor in areas not presently devoted to this use will probably, in the foreseeable

future, commit these lands to an industrial type use (attract other utilities or power companies to use this corridor or locate adjacent to it). There is also a loss of aesthetic natural beauty.

(2) It will take approximately 5 acres of productive agricultural land out of production for the foreseeable future. During construction about 10 acres will be non-productive when access roads are in use.

(3) There will be a certain degree of radio and television interference in homes located near the line and in auto radios passing under the line at the several road crossings.

(4) There will be a temporary disturbance of wildlife territorial habitat and movement until construction is completed.

(5) There will be a temporary loss of livestock feed for at least a 15-year period while the native plant life reestablishes itself or while reseeded areas become established.

(6) There may be a loss in value of lands being sub-divided or held for speculative appreciation, that are traversed by or are adjacent to this corridor. This may be especially so if other utilities are attracted to the corridor.

(7) Remote roadless primitive areas, mainly on the Indian

reservation, will be more readily susceptible to human encroachment. This may interfere with Indian cultures.

(8) Transmission line rights-of-way have historically been the dumping grounds for indiscriminate dumpers. Dumping will probably occur along this corridor.

Unavoidable adverse effects on the land will take the forms and impacts listed below.

(1) There will be both wind and water activated soil erosion during the construction period. Movement of construction vehicles in erecting transmission towers and stringing conductors will break the natural surface soil crust and expose the unconsolidated soils to movement. Depressions from vehicles will provide channels on slopes for more rapid runoff during intense storms experienced in the area. There should be a gradual decrease in soil erosion as the estimated 5-year period required to reach complete vegetative rehabilitation is approached.

(2) There will be a loss of vegetation, estimated to be about 4000 kilograms per acre per year (Ref. 4, p. 104). This loss will decrease as the effects of rehabilitation take place. Also lost with the vegetation is its soil holding capacity and its contribution to the natural life processes.

(3) There will be some diversions of normal watershed runoff due to road construction. This change could alter the existing patterns of vegetative growth.

## 2. Water

### a. Description of existing environment:

#### (1) Surface Water

Except for occasional major storms, there is no outflow of runoff from the immediate region. Most of the desert runoff is consumed rapidly by evaporation and infiltration in the alluvial valleys. Surface waters that are captured and stored at higher elevations are partially the result of snowmelt.

The Lower Colorado Region Comprehensive Framework Study describes the quality of the surface water being received in the general area, (Ref. 9):

> "In the headwaters of the Gila River, water quality is generally good with total dissolved solids concentrations less than 500 mg/l. However, in the middle reaches below points of major diversions, water quality generally deteriorates to a range of 500 to 1,000 mg/l. This pattern of increasing TDS in a downstream direction is largely due to the consumption of water and to the salts added by pickup from point sources, irrigation, and other uses of water. The effect is to concentrate the dissolved solids in the remaining water, thus resulting in a degradation of stream quality in a downstream direction. This concentrating effect continues into lower reaches of the same stream, until successive uses have consumed the entire streamflow. This situation is observed on the Gila River below Phoenix where highly saline flows are diverted to leave a dry streambed between Gillespie Dam and Painted Rock Dam, a distance of 60 miles.
>
> "The fluoride content, normally about one mg/l in most parts of the Region, is relatively high. This level of natural fluoride concentration persists even during flooding on some upstream portions of the Gila River.
>
> "Biological quality, characterized by nutrients,

> dissolved oxygen, and bacterial concentrations, is considered reasonably good except for some local problems. For example, the presence of nutrients from manmade sources has caused excessive algae growths in localized areas of Lake Mead, a major recreation area. In isolated cases, bacterial concentrations have exceeded desirable levels in streams below smaller communities and resort areas.
>
> "Sediment concentrations range from very high to moderate in the Region. . . . On Basin and Range Lowlands, the yields are moderate with concentrations averaging about 20,000 ppm. The annual average sediment yield in most areas stays within moderate bounds due to infrequent occurrence of heavy rainfall; however, the control and removal of sediment constitutes a major operational problem in many areas."

(2) Ground Water

This general area has experienced the withdrawal of large amounts of ground water from the alluvial basins. Withdrawal in great quantities has been for irrigated agriculture. Water tables have been steadily declining, as evidenced by the land subsidence discussed earlier. The annual overdraft is estimated as about 2.5 million acre feet (Ref. 9, p. 101).

Ground water quality in the general area, as described in the Lower Colorado Region Comprehensive Framework Study, is as follows (Ref. 9, pp. 26,27):

> "The mineral quality of ground water ranges from excellent to unsuitable for any purpose. Ground water in the alluvial deposits of the Basin and Range Lowlands, for example, contains from less than 100 to more than 100,000 mg/l of dissolved solids. In most of these deposits, however, dissolved solids concentrations are less than 1,000 mg/l. Concentrations vary not only areally but also with depth. As a result, the concentrations of dissolved solids for a

given well will change abruptly and so will the ionic makeup.

"The ground water ranges from soft to very hard, from less than 60 mg/l to more than 180 mg/l of calcium carbonate. The concentrations of the minor constituents such as iron, magnesium, and silica vary considerably throughout the Region but, except for fluoride and nitrate, are not objectionable for most uses. Though concentrations of nitrate are generally small in water from drilled wells, water from many wells in the Basin and Range Lowlands will contain in excess of 2 mg/l of fluoride. Fluoride content in excess of the amount allowed by U.S. Public Health Service Drinking Water Standards is found in waters at numerous locations throughout the Lower Colorado Region."

b. Environmental impact of the proposed action:

(1) Surface Water

There will be no impact on the quantity of surface waters passing through the corridor. There may be some temporary diversions of flow caused by road building, but no use or consumption of surface waters is expected.

There could be minor degradations of surface water quality due to the careless, intentional, or accidental disposal of effluents, garbage, trash, chemicals, petroleum products, or other waste resulting from the construction of the proposed transmission lines.

(2) Ground Water

Since there is no expected use or consumption of ground waters, there should be no impact upon the quantity or quality of this resource. An exception might occur should there be any disposal of effluents, chemicals or petroleum products.

c. Mitigating measures included in the proposal:

The applicant's proposed mitigating measures associated with water quality are outlined in the section on Waste Disposal and the section on Herbicides described in Appendix 10. Construction mitigation measures that affect water are also considered.

d. Additional mitigating measures to be included:

The Department of the Interior will make the stipulations cited in Appendix 6 a part of the terms of the right-of-way grant should favorable action be taken on the application. Stipulation H-16 goes farther than just considering the use of herbicides. It requires that the grantee obtain the approval of the Authorized Officer prior to the use of any poison. It limits the use of certain poisons and controls the quantity and method of application.

Stipulation H-17 provides that the Authorized Officer shall approve the site of any kind of waste disposal so that no contamination is allowed to come in contact with surface or ground waters. Approved sites will be local government approved or controlled sanitary land fills or toxic waste disposal stations.

e. Unavoidable adverse effects:

There should be no unavoidable adverse effects on water resources during the construction of these transmission lines. An accidental waste spill would be the only exception.

### 3. Air

a. Description of the existing environment:

The area in which this corridor is located has experienced a progressively noticeable increase in air pollution in the last few years. Incineration and fuels used in power production, transportation, home and commercial heating and industrial expansion are the big contributors to the problem. Advances for cleaner air have been blunted by the rapid immigration of new residents and the resulting explosive growth of the Phoenix-Tucson corridor area, with more autos, more industry, and more homes to heat.

#### (1) Particulates

Because of the extreme aridity and normal air movement of the area, there probably has been a greater amount of natural particulate matter in the air here than in some other areas. The popularity of the area and the rapid population growth have resulted in the disturbance of a large area of relatively stable soil surface and a corresponding increase in the level of particulates in the air. Following is a summary of annual average air quality values for particulate matter (Ref. 14, p. 70):

| | Annual Average Values | | | |
|---|---|---|---|---|
| Air Quality Measurements | Value | No. of Stations | Value | No. of Stations |
| Suspended Particulate (Hi-Vol) | exceeded 100 ug/m$^3$ | 17 | exceeded 140 ug/m$^3$ | 9 |
| Suspended Particulate (Tape Sampler) | not exceeding 0.46 COHS/1000' | 10 | | |
| Settleable Particulate (Dust fall) | greater than 10 tons/mi$^2$/mo | 4 | greater than 20 tons/mi$^2$/mo | 2 |

(2) Corona Effluents

These effluents are made up of ozone and nitrogen oxides. Below are the average existing values and the standard allowable values for this corridor area that were gathered in 1969. There has been little change to date (Ref. 2).

| | Oxidant (ozone) | Nitrogen |
|---|---|---|
| Standard allowable | 150 ug/m$^3$ | 100 ug/m$^3$ |
| Average existing | 17.5 ug/m$^3$ | 54 ug/m$^3$ |

(3) Visibility

On still days, there is easy delineation between the population centers of Phoenix and Tucson and the less intensively developed lands between them where the air is relatively clear. The blanket of air pollutants seems to extend 10 to 15 miles around each population center. When there are strong winds, dust and other particulates in the air blanket large portions of the State.

b. Environmental impact of the proposed action:

(1) Particulates

There will be some particulates added to the air in the clearing and construction activities associated with these proposed transmission lines. The amount of particulates should not be excessive with the implementation of the mitigating steps suggested by TG&E. Amounts of dust arising from this effort should become progressively less as the revegetation becomes established. Dust may be generated on access roads if roads are not closed to traffic and returned to a natural state.

(2) Corona effluents

It is expected that gaseous effluents of ozone and nitrogen oxides will be produced by the conductor corona. Tests reveal that the ozone and nitrogen oxides produced on 765 kv power lines are well under the standards issued by the Environmental Protection Agency. Since the capacity of the proposed lines is approximately half of that produced by the 765 kv lines, the gaseous effluents emitted can be considered insignificant.

(3) Visibility

There is bound to be some loss of visibility during windy periods in the vicinity of the corridor. It is not likely that this effect will carry much beyond the immediate corridor.

c. Mitigating measures included in the proposal:

Criteria proposed by TG&E for the control of dust and other air pollutants are outlined in Appendix 10 in the sections on Dust Control and Waste Disposal.

d. Additional mitigating measures to be included:

Any road constructed will be permanently closed after construction is completed except if exempted by the Authorized Officer. Measures to control air pollution will be included in the terms and conditions of the right-of-way grant. (See App. 6.)

e. Unavoidable adverse effects:

Surface disturbance will add particulates to the air. Vision may be lessened in the immediate corridor area. There will also be a small but insignificant emission of oxidants through the corona phenomenon along the conductors.

## B. Living Components

### 1. Plants

a. Description of the existing environment:

The entire region between Tucson and Phoenix lies within the Sonoran Desert (Ref. 10, 11), in the Basin and Range Physiographic Province (Ref. 5), as is shown on Map No.6. Within this region, there are four major natural plant communities (vegetative types), each being dominated by different plant species. Not included are areas disturbed by man's use, i.e., cropland.

These four plant communities (vegetative types) are shown on Map No.7 and are described below:

(1) Paloverde - Saguaro Type. - The paloverde - saguaro type is an upland plant community dominated by giant saguaro cactus (Carnegiea gigantea) and associated foothill paloverde trees (Cercidium microphyllum). This plant community is the most complex and diverse natural community in the Arizona upland desert. Because of its complexity, the paloverde - saguaro type is the most sensitive plant community along the proposed route. In addition to its biological interest, it provides some of the most magnificent desert scenery in North America.

(2) Desert Riparian Type. - The desert riparian communities occur in the fingerlike drainage and streamways within communities of desert species that have lower moisture requirements.

This type consists of desert and grassland species which require more moisture and occur along streams and washes. Desert riparian species common to arroyos or intermittent washes in this region include whitethorn (Acacia constricta), catclaw (Acacia greggii), mesquite (Prosopis juliflora), and blue paloverde (Cercidium floridum). These trees and shrubs, along with several associated species, are common throughout the Sonoran Desert.

The riparian communities are estimated to be second on the ecological scale of sensitivity after the paloverde - saguaro type.

(3) Creosote Bush Type. - This type is the major flatland desert community in southwestern Arizona. The two most important dominant plants are creosote bush (Larrea divaricata) and white bursage (Franseria dumosa). Although large areas of this type have been cleared for cropland, it still remains one of the most extensive vegetative communities in the Sonoran Desert.

This shrub-dominated community is much simpler in structure, lower in species diversity, and capable of more rapid recovery after disturbances than are the tree-dominated types.

(4) Mesquite Type. - Mesquite (Prosopis juliflora) was once an important component in the natural vegetation of desert areas between Phoenix and Tucson. The most important mesquite

areas historically were magnificent forests in the major drainage systems--the Gila, the Salt (Phoenix area), and the Santa Cruz (Tucson area) Rivers. These river forests are now essentially destroyed, and the remnants are rapidly being eliminated. These river forests have been invaded and in part replaced by salt cedar (Tamarix gallica).

b. Environmental impact of the proposed action:

(1) Power System Design Standards: Estimated impacts from construction, operation and maintenance are based on the following design criteria (Ref. 4):

(a) Free-standing tower interval of 1300 feet.

(b) Free-standing tower base 31.5 feet square.

(c) Guyed-delta tower interval of 1200 feet.

(d) Guyed-delta tower base 5.0 feet square.

(e) 1.20 miles of access road for each mile of initial transmission line construction.

(f) 0.25 miles of access road for each mile of initial transmission line construction along existing powerline right-of-way.

(g) An estimated 0.10 mile of new road added per mile for construction of second line in the corridor.

(h) Maximum access road width of 14.0 feet.

(i) Staging and warehousing areas, approximately 5 acres each, at 40-mile intervals along the corridor. (None on national resource lands.)

(j) Four off-site microwave communication sites (excluding South Substation and El Sol Substation) will be necessary.

(2) Construction Impacts: The corridor will pass through vegetative types as described below (does not include suburban):

| Vegetative Type | New R/W (Miles) | Existing R/W (Miles) | Total (Miles) |
|---|---|---|---|
| Paloverde - Saguaro | 38 | 15 | 53 |
| Creosote Bush | 53 | 6 | 59 |
| Riparian | 13 | 2 | 15 |
| Mesquite | 25 | - | 25 |
| Other (cropland) | - | 13 | 13 |
| Total | 129 | 36 | 165 |

Impacts of construction of two transmission lines will stem from two main sources: Road construction (assuming tower placement, etc., can be accomplished from access roads); and staging areas.

(a) Impacts as a result of new roads. - Access roads to support the primary right-of-way would be needed within the above vegetative types as follows:

| Vegetative Type | Road Required for Construction | | | Total Road (Miles) |
|---|---|---|---|---|
| | Initial line (mi.) | | Second line (Miles) | |
| | Along New R/W | Along Exist. R/W | | |
| Paloverde-saguaro | 45.6 | 3.8 | 5.3 | 54.7 |
| Creosote bush | 63.6 | 1.5 | 5.9 | 71.0 |
| Riparian | 15.6 | 0.5 | 1.5 | 17.6 |
| Mesquite | 30.0 | - | 2.5 | 32.5 |
| Other(cropland) | - | 3.2 | 1.3 | 4.5 |
| Total | 154.8 | 9.0 | 16.5 | 180.3 |

A 14-foot access road will disturb about 1.67 acres of vegetation per mile. Based on this estimate of disturbance, the following acreages will be removed from each vegetative type for roads needed to construct the power transmission lines:

| Vegetative Type | Area req'd for roads during const of | | Total Area (acres) |
|---|---|---|---|
| | Initial line (acres) | Second line (acres) | |
| Paloverde-saguaro | 82.5 | 8.8 | 91.3 |
| Creosote bush | 108.7 | 9.9 | 118.6 |
| Riparian | 26.9 | 2.5 | 29.4 |
| Mesquite | 50.1 | 4.2 | 54.3 |
| Other (cropland) | 5.3 | 2.1 | 7.4 |
| Total | 273.5 | 27.5 | 301.0 |

(b) Impacts as a result of staging areas: Based on previously mentioned staging area requirements, about nine staging areas will be needed during construction. Of these, it will be necessary to place about five in areas of natural vegetation: four in the creosote bush type and one in the mesquite type. This would result in a loss of about 20 acres from the creosote bush type and about 5 acres from the mesquite type.

(c) Summary of construction impacts within natural vegetative types:

| Vegetative Type | Road Requirements (Acres) | | Staging Areas (Acres) | Total (Acres) |
|---|---|---|---|---|
| | Initial line | Second line | | |
| Paloverde - saguaro | 82.5 | 8.8 | - | 91.3 |
| Creosote bush | 108.7 | 9.9 | 20 | 138.6 |
| Riparian | 26.9 | 2.5 | - | 29.4 |
| Mesquite | 50.1 | 4.2 | 5 | 59.3 |
| Other (cropland) | 5.3 | 2.1 | - | 7.4 |
| Total | 273.5 | 27.5 | 25 | 326.0 |

Of the estimated 326 acres disturbed during construction, very little disturbance would be permanent. It would probably require 5 to 15 years for the disturbed area to revegetate (lower growing plants), with the trees, shrubs, and cacti requiring as long as 100 years to fully recover from the disturbance.

(3) Operation and Maintenance Impacts. - The following are the number of guyed delta towers required for the operation of the two transmission lines within each vegetative type:

| Vegetative Type | Initial line | | Second line | | Total | |
|---|---|---|---|---|---|---|
| | No./Towers | Acres | No./Towers | Acres | (No.) | Acres |
| Paloverde-saguaro | 233 | 0.13 | 233 | 0.13 | 466 | 0.26 |
| Creosote bush | 260 | 0.15 | 260 | 0.15 | 520 | 0.30 |
| Riparian | 66 | 0.04 | 66 | 0.04 | 132 | 0.08 |
| Mesquite | 110 | 0.06 | 110 | 0.06 | 220 | 0.12 |
| Other (cropland) | 47 | 0.03 | 47 | 0.03 | 94 | 0.06 |
| Total | 716 | 0.41 | 716 | 0.41 | 1432 | 0.82 |

For the operation of the two lines, something less than 1 acre of natural vegetation would be permanently removed from production and displaced by tower bases of concrete.

c. Mitigating measures included in the proposal:

(1) Power System Design

(a) The use of guyed delta towers will result in about one-sixth as much area being removed indefinitely from vegetative production than if free standing towers were used.

(b) Guidelines used in selecting tower sites are outlined in Appendix 10.

(2) Construction

(a) Attempts have been made by TG&E to locate the line in such a manner as to minimize distance through the most sensitive vegetative type--paloverde-saguaro.

(b) The line closely parallels an existing overhead transmission line for approximately 45 miles.

(c) Microwave communication sites will use existing communication sites or previously disturbed areas.

(d) It is the intent of TG&E to hold construction of new roads to an absolute minimum.

(e) Construction guidelines designed to reduce the environmental impacts of the construction phase are outlined in Appendix 10.

(3) Operation and Maintenance: All operation and maintenance surveillance will be accomplished by helicopter, thereby eliminating the need for permanent access roads. Surface travel may be required only to provide maintenance service at specific points identified by air travel.

d. Additional mitigating measures to be included:

(1) Construction: The following requirements will be included as part of the terms and conditions of the right-of-way grant, should the application be approved.

(a) Before any construction begins, the Grantee will present a complete plan of operation to the Authorized Officer and the Papago Tribe. Before construction on any segment begins, the Authorized Officer, the Tribe (if construction is on Indian land), and the Grantee shall agree to the location of tower sites, roads, and related facilities, and the construction and rehabilitation methods required to meet the conditions of the grant.

(b) The access road system created for construction purposes must be approved by the Authorized Officer and the Tribe if roads are on Indian land; and any roads constructed will be permanently closed after the construction is complete unless specifically exempted by the Authorized Officer or the Tribe.

(c) All disturbances of vegetation must be approved by the Department.

(d) Grantee shall provide at his expense for prompt scarification and seeding of disturbed areas in Pima County which, in the opinion of the Authorized Officer, lend themselves to successful seeding. Forage and game species of seed shall be provided by the grantee and applied in accordance with specific instructions and techniques prescribed by the Authorized Officer.

Inspection and evaluation of seeding measures taken will be made by the Authorized Officer as soon as possible to determine if a satisfactory growth has been established. In no instance shall this vegetative cover check be made until after completion of the first growing season. If needed, a plan for reseeding shall be instigated by the Authorized Officer.

(2) Operation and Maintenance: Within 90 days of completion of construction, the Grantee shall submit a maintenance plan for the approval of the Authorized Officer.

e. Unavoidable adverse effects:

Provided all mitigating measures are followed, the proposal will result in the temporary disturbance of about 326 acres of natural vegetation by roads and staging areas. In addition, less than 1 acre (about 0.82) of land would be removed from vegetative production for use as tower bases and guyline bases.

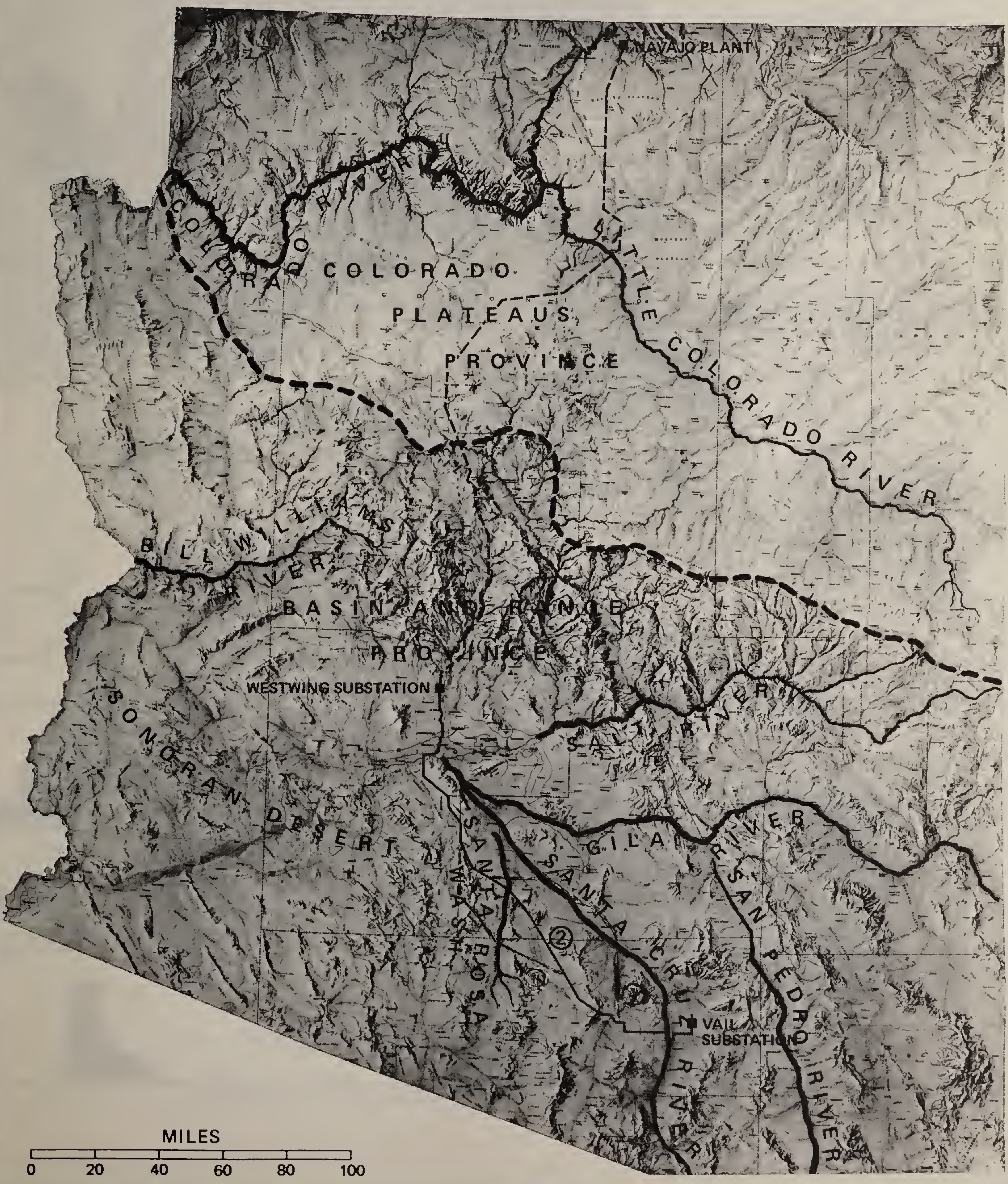
# TOPOGRAPHY ALONG PROPOSED ROUTE

**MAP No. 6**

**LEGEND**

- - - - 500 KV transmission line

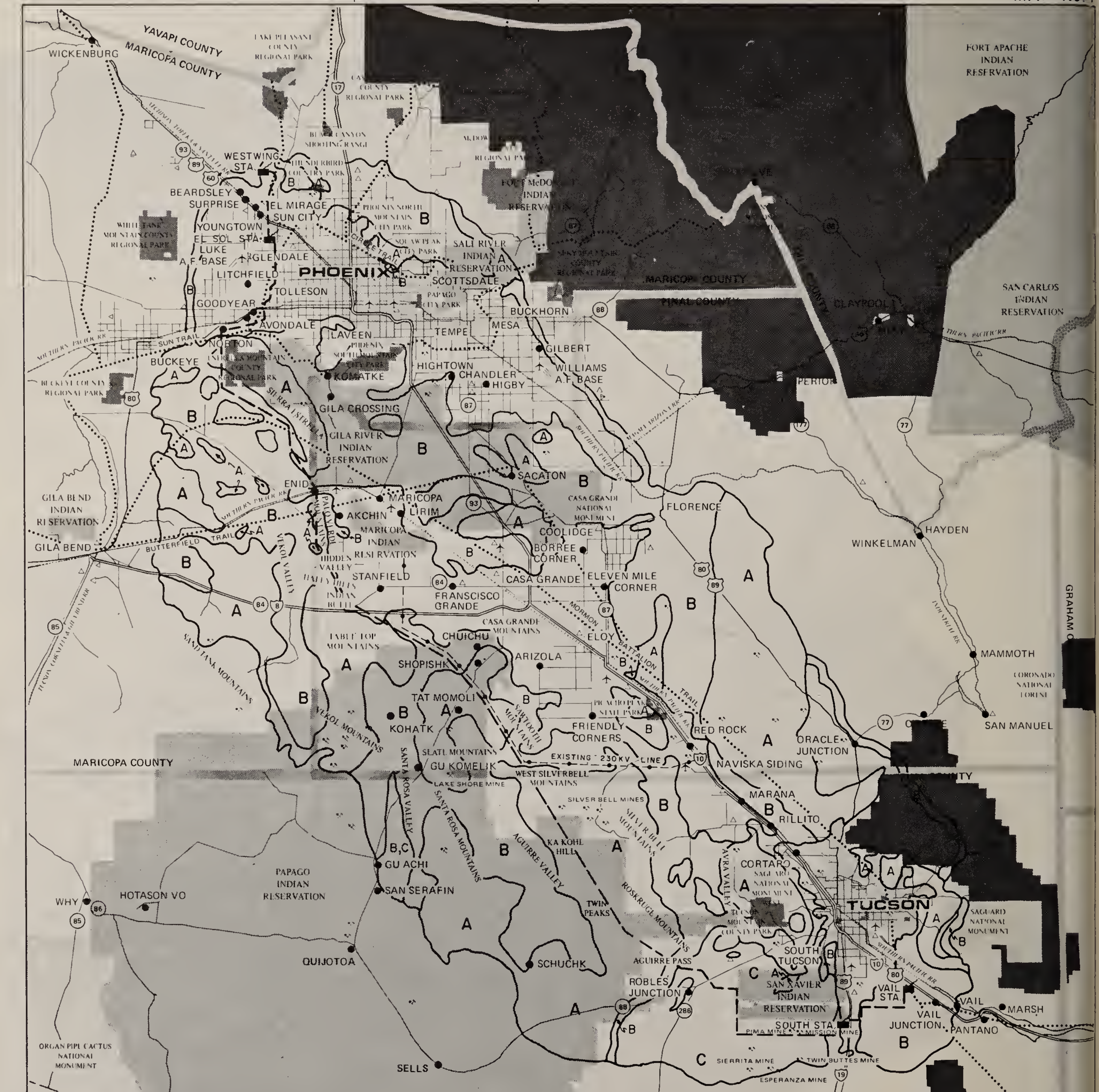
—— Proposed EHV transmission line corridor route



## PLANT COMMUNITY DISTRIBUTION

A– Poloverde, Sohuoro
B– Creosotebush
C– Mesquite
– – – Proposed Route

MAP No. 7



## 2. Animals

a. Description of the existing environment:

General. The Lower Sonoran Desert is characterized by a wide variety of animal life. Man's activities have to some extent altered this environment by irrigation and habitation, thereby restricting the suitable living areas of those species dependent on undisturbed desert habitat; but irrigated farms also provide a new habitat. Farmland has added variety and water to the already diverse habitat for a wide range of animals.

(1) Mammals: More than 30 species of native mammals could be encountered within the proposed corridor, including everything from bats to desert bighorn sheep. None are endangered species. Three of the larger species will be discussed below. These larger mammals individually have a somewhat broader range, are lower in overall numbers, are less concentrated, and are therefore more likely to be impacted significantly than are the smaller more numerous species.

(a) Javelina: This species does well in the sparsely populated desert mountain areas between Phoenix and Tucson. It is one of the few native animals experiencing a gradual expansion of range. They are diurnal and nocturnal and rest in caves, rock outcrops, and thick brush along drainageways. The javelina is hunted in late winter.

(b) Desert Mule Deer: This animal is a subspecies of the wide-ranging mule deer common to the plateau and mountain regions in the Western United States. It is active at night and seeks shelter in thick brushy paloverde - saguaro vegetation and riparian thickets during the day.

This species is fairly tolerant of sparse human habitation and takes good advantage of increased feed and water found in irrigated fields along the route. The desert mule deer is hunted in the fall.

(c) Desert Bighorn Sheep: Man's activity and encroachment into habitat of this highly intolerant (to man's activity) species has reduced its once widespread range to isolated rough mountain ranges. The Sierra Estrella, and Silver Bell - Waterman - West Silver Bell - Roskruge Mountain areas now have resident herds along the route. In addition, some seasonal migration between mountain ranges occurs. The animal is most likely to be encountered in the Aguirre Pass area of the corridor. It is a prized trophy and is hunted in the winter in the Sierra Estrella range only. Other areas along the corridor are closed to hunting. Normally this animal expands its range during the winter months when temperatures are lower and water is more widespread.

In addition to native mammals, domestic livestock (primarily cattle) graze yearlong within the proposed corridor. An average of about two animals per section (640 acres) use the corridor.

Appendix 5 contains a partial list of wild mammals which inhabit the area.

(2) Birds: A relatively large number of resident breeding bird species (known to be more than 40) inhabit the proposed corridor. In addition, more than 30 species reside here in the winter, and more than 20 species are summer inhabitants. An unknown large number of birds migrate through the corridor to other winter or summer destinations (spring and fall months).

Although the majority of the resident (full and part time) species which inhabit the corridor can be found scattered along the entire length, preferred habitats are the mesquite associations, irrigated farmland areas, paloverde associations, and riparian areas, in that order. Creosote bush dominated associations are preferred habitat for only three species of about 90 researched.

With the exception of starlings and English sparrows (other than game species--quail and doves), birds are protected by law in Arizona.

The proposed corridor does not conflict with any known golden eagle or black vulture nesting areas, although eagles and vultures use the area for hunting and resting. The American Peregrine Falcon is the only endangered species believed to inhabit the corridor.

Appendix 5 contains a partial list of birds which inhabit the area.

(3) Fish: No fish are known to inhabit waters along the proposed route, principally because of lack of fish habitat.

(4) Reptiles and Amphibians: These cold blooded animals

are found throughout the proposed corridor. About 40 species are likely to be encountered, of which snakes and lizards are most common. Five poisonous species of rattlesnakes are known to inhabit the area.

The desert tortoise and the Gila monster are probably the two most important species to be found along the route and both are protected by State law.

(a) Desert Tortoise: This animal is strictly terrestrial and a vegetarian. Although it is not abundant at any location, it could be found anywhere in natural desert vegetation of the corridor. It is, however, found predominately in rocky foothills where it burrows into hillsides and under rocks, often taking advantage of initial excavations made by other animals.

(b) Gila Monster: This species is found principally in undulating rocky foothill terrain, in rocky-gravelly bajadas, and in rocky canyons. It is found much less frequently or is absent on open desert plains. Shelter is taken in rodent burrows, wood rat nests, dense thickets, and under rocks.

Nearly half of the reptiles and amphibians likely to be found in the corridor prefer the paloverde plant associations as habitat, while less than five prefer creosote bush associations. Also, a fairly large number of species prefer rocky areas for sunning spots and shelter, and a large number use rodent burrows for shelter. Normally, most species are less active through the winter months.

Appendix 5 includes a partial list of amphibians and reptiles which inhabit the area.

(5) Invertebrates: Literally thousands of species of invertebrates exist within the proposed corridor. Those with infectious bites or stings include the tarantulas, desert centipedes, black widow spiders, and scorpions. Insects are the most noticeable of the invertebrates and thrive in this frost-free desert climate. The relatively short life cycles of these animal forms assure them of recovery from almost any disturbance within a short period of time.

b. Environmental Impact of the proposed action:

(1) Power system design impacts: None

(2) Construction impacts:

(a) Construction activity will cause the temporary disturbance of about 300 acres of habitat, including vegetation, for a period of up to 15 years.

(b) During construction activity, heavy equipment, vehicles, and blasting may kill large numbers of invertebrates, reptiles and amphibians, and small mammals; and a population decrease may be noted for a period of probably less than 5 years. Then populations (due to short life cycles) should increase rapidly to near original levels.

(c) Construction activity will probably disturb nesting areas (trees and shrubs) for about 40 resident bird species for a period of 2 to 5 years.

(d) Human disturbance (noise) will disturb the desert bighorn sheep, especially in the Aguirre Pass area, and will cause a temporary change of habit for those animals found there.

(e) Blasting noise may affect the daily and seasonal movement patterns of wildlife and will create additional stress to animals.

(3) Operation and Maintenance impacts:

(a) Roads constructed, if not properly closed and/or rehabilitated, will provide additional permanent access into wildlands for all types of users, creating added opportunities for poaching wild game, harrassing wildlife, and putting continued stress on the lives of larger animals.

(b) The continued use of roads would also result in a permanent loss of habitat for all animals.

(c) The tower bases and other permanent structures should remove less than one acre of habitat from production.

(d) Areas cleared for roads and towers will create, to a small degree, added edge effect. Improved habitat will exist during the period of plant recovery.

c. Mitigating measures included in the proposal:

(1) Power System design:

(a) Insulator strings on all towers are over 8-1/2 feet in length. This length is greater than the wing span of any indigenous birds, and consequently birds flying near or resting on towers or insulators will not be harmed.

(b) Guyed towers minimize permanent land use for foundation structures.

(c) Towers are designed to be partially assembled in staging areas away from the tower erection site. Work and the associated disturbances along the line are therefore minimized.

(d) The two-conductor design will minimize audible noise due to corona produced in foul weather by water droplets on the conductor surface. During fair weather the design will produce practically no noise.

(e) All metal fences and gates under the line will be grounded to remove electrostatically induced voltages on them during operation of the line.

(f) Microwave communications links will use existing sites.

(g) The proposed power line is located within low value (relatively) habitat (creosote bush type) as much as possible.

(2) Construction: General mitigating measures are outlined in Appendix 10. The following are of special note:

(a) All vegetation on or immediately adjacent to disturbed areas shall be preserved and protected.

(b) Firearms are not permitted to be carried while on the project.

(c) Unless large plants within the construction area interfere excessively with equipment movement, they will not be removed but will be marked for preservation.

d. Additional mitigating measures to be included:

The following measures will be included in the right-of-way grant to protect wildlife values, should the application be approved:

(1) Power System design: A complete plan of operation shall be submitted to the Bureau of Land Management, the Bureau of Indian Affairs, and the Papago Tribal Utility Authority, for approval prior to any activity on the ground. This plan should cover the entire project, including all construction support needs, access roads, microwave sites, material sites, staging areas, etc., and restoration plans therefor.

(2) Construction:

(a) No trees shall be removed without the prior authorization of the Department. Mesquite trees are especially valuable as bird nesting habitat.

(b) Construction activity south of the north boundary of the Papago Indian Reservation and north of the Three Points area may be restricted to the summer months of June, July, August and September, when bighorn sheep and other large mammals are present in fewer numbers.

(3) Operation and Maintenance: No additional measures are required.

e. Unavoidable adverse effects:

(1) Power System design: None, provided all mitigating measures are taken.

(2) Construction:

(a) Removal and disturbance of about 326 acres of habitat for a period of up to 15 years (noted earlier).

(b) Large numbers of small animals may be killed during construction. The effect will probably extend no more than a 5-year period and probably much less. Due to the short life cycles, these small animals should increase rapidly to near original levels.

(c) Noise and construction activities will temporarily cause some biological stress and force large mammals to temporarily alter travel routes and other habits.

(3) Operation and Maintenance:

(a) Tower bases and other permanent structures will take out of production less than one acre of habitat.

## 3. Humans

a. Description of the existing environment:

A total of 8,675 houses fall within the 2-mile wide corridor area being considered in this statement: 8,581 of these are located north of the Gila River crossing near Norton, and only 94 from that point to Vail Substation near Tucson. The corridor north of the Gila River passes along the western outskirts of the Phoenix metropolitan area. Settlement patterns to date indicate that growth will continue in a westerly direction to and past the power line. The corridor, for the most part however, centers on the Agua Fria River and adjacent flood plains which are unsuitable for residential development. Significant population increases outside of the Salt River Valley and within the proposed corridor are unlikely in the foreseeable future.

b. Environmental impact of the proposed action:

No significant impacts on human settlements or settlement patterns are foreseen which are not discussed in other sections of this environmental statement.

c. Mitigating measures included in the proposal:

(1) The corridor was selected largely because of the low population densities along the majority of its distance.

(2) Dust control shall be performed as the work proceeds and whenever a dust nuisance or hazard occurs. Approved methods will be used to control dust to conform with State and Federal air quality standards.

d. Additional mitigating measures required:

No additional measures are required.

e. Unavoidable adverse effects:

None are recognized at this time.

## C. Ecological Interrelationships

### 1. Description of the Existing Environment

a. Energy Transfer:

Four major ecological communities or ecosystems exist within the proposed corridor: (1) paloverde - saguaro; (2) riparian; (3) creosote bush - bursage; and (4) mesquite. None of the four are unique or rare communities in the southwestern desert.

In general, the gradient from the top of a desert mountain or butte to the adjoining valley bottom involves a gradual change in rock size and soil particle size, starting with rocks and rock outcrops and associated coarse soils in the mountains, to fine alluvial fills in the valleys. This desert gradient in soil particle size is accompanied by downslope gradients of decreasing precipitation and increasing air and soil temperatures (Ref. 7).

The resultant biotic structure of the environmental gradient is a higher elevation mountain slope community (paloverde - saguaro) consisting of a complex vegetative and animal structure, grading downslope with decreasing complexity of vegetative and animal structure to simpler flatland shrub communities. The shrub communities are commonly dominated by creosote bush in association with one or more small shrubs on a relatively fine textured soil.

These communities or ecosystems are in dynamic balance, i.e., soil-plants-animals-man. Some of the more significant relationships in the system are summarized below.

(1) Breeding bird species diversity is directly related to nest-site diversity, which depends upon plant-form diversity. It is evident, therefore, that of the communities involved, creosote bush - bursage is the least critical nesting habitat and animal habitat; while mesquite, paloverde-saguaro, and riparian communities are relatively more important.

(2) A large number of amphibians and reptiles rely on rodent burrows for shelter, and rocks and rocky areas for shelter and sunning stations. This is especially true of the Gila monster.

(3) Appendix 5 contains a partial list of vertebrates, and summarizes preferred or necessary habitat relationships for some specific birds, reptiles, and amphibians. This information tends to substantiate the importance of each ecosystem as previously related.

b. Nutrient Cycle:

No significant interlocking relationships are recognized.

c. Hydrologic Cycle:

More than 95 percent of the precipitation falling within the proposed corridor is lost by evaporation and transpiration. Of the remaining 5 percent, some flows overland from mountain areas before seeping into groundwater aquifers, while the remainder seeps directly into the aquifer. More water is pumped from the groundwater basins along the corridor than enters it as recharge.

A definite relationship exists between intermittent stream flow and riparian vegetation. Riparian areas are preferred habitat for a wide range of animals and are natural wildlife trails through areas with relatively less cover, i.e., creosote bush-bursage vegetative type.

## 2. Environmental Impact of the Proposed Action

a. It is possible that washes or intermittent streams could be blocked, thereby restricting overland flows. If this were to happen, it could affect the riparian vegetation below the blockage, thereby affecting some preferred animal habitat and travel areas. If this were to happen along the entire route, it could be significant.

b. Rock outcrops and other rocky areas are preferred by the Gila Monster; extensive disturbances in such areas could be significant.

c. Ecosystems along the line will be temporarily disturbed which will, for a short period of time, cause the systems to seek a new balance point. This time span is not considered a significant disturbance.

3. Mitigating Measures Included in the Proposal

A full listing of proposed mitigating measures is included in Appendix 10. Highlights of these guidelines include:

a. Roads shall cross drainage bottoms at right angles and level with stream gradient.

b. There shall be no pushing of soil into stream beds.

c. Care shall be taken so that erosion problems do not develop below the construction sites due to channeling water into new areas.

d. Disturbance of drainage bottoms will be minimal and all bottoms shall be restored to their preconstruction gradient and width to prevent accelerated gully erosion.

e. The corridor was located in foothills and valley areas almost in its entirety in an attempt to avoid as much of the paloverde community as possible.

4. Additional Mitigating Measures to be included:

Administration of these measures is to be a part of the approval process in developing the Grantee's plans of operation, should the right-of-way application be approved.

a. Drainage crossings of roads will be located to avoid dense vegetation as much as possible and at points where wash banks are lowest.

b. No tower sites will be located in riparian communities.

c. Tower sites, when feasible, will not be located in rocks or rocky areas.

d. Direct tower to tower travel will not be allowed without specific approval by the Authorized Officer.

5. Unavoidable Adverse Effects

None of significance.

## D. Aesthetics

### 1. Visual

a. Description of the visual environment:

Man is affected in two ways by his visual environment: By what he visually perceives, and by the frequency and length of time he sees a particular landscape feature. An attempt to depict the scenic values that a person would visually perceive in the vicinity of the proposed route is shown on Map No 8. The zones depicted on Map 8 are taken from the Bureau's Scenery Classification System. It corresponds with a Scenery Classification completed by a contractor for the T.G. & E. analysis. The frequency and length of time one visually perceives these scenic values, or in this case, the components of the power distribution system imposed on the landscape, are contingent on the location of resident and transit populations. (See the statistics on residences and highway systems in b. below.)

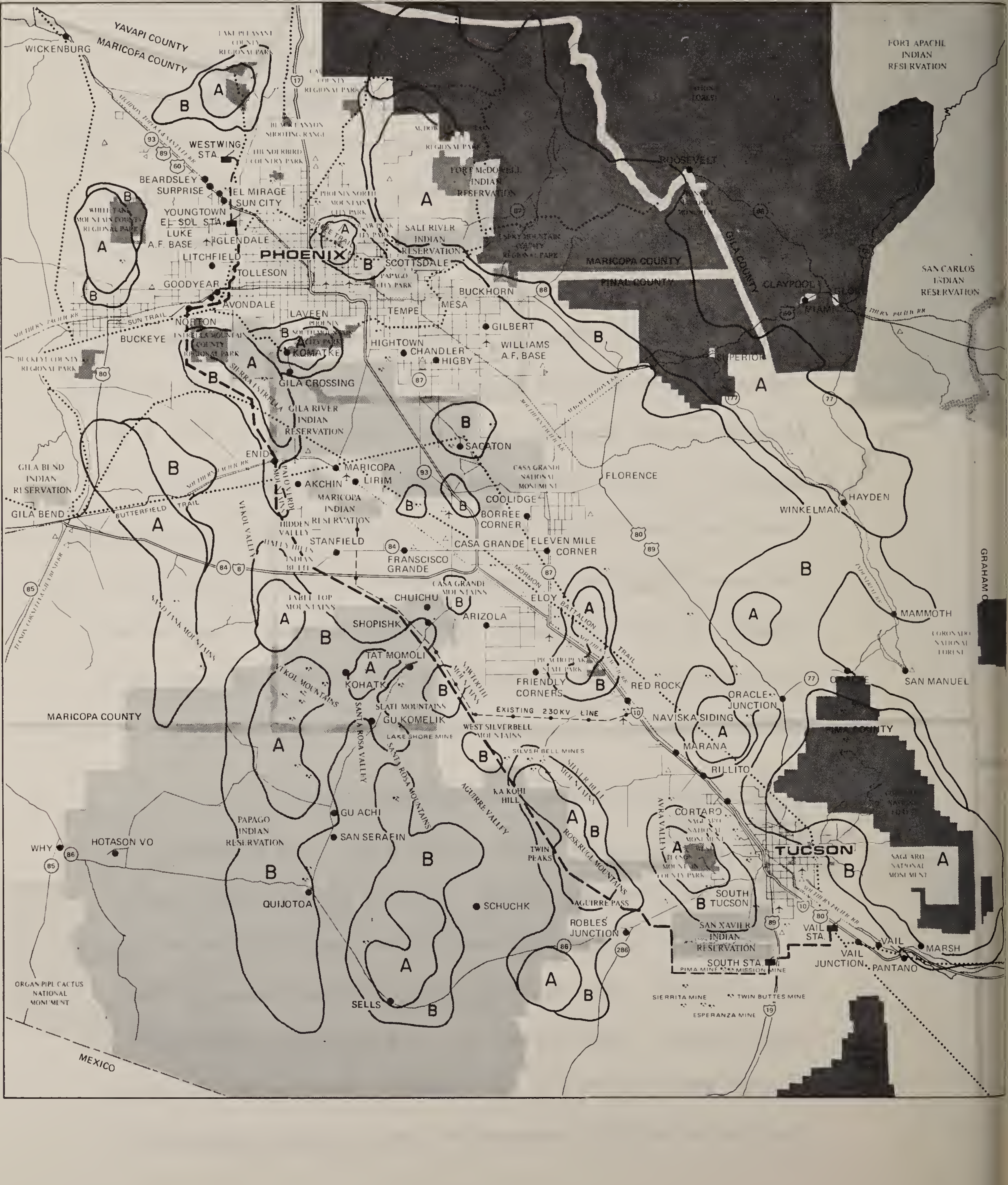
b. Environmental impact of proposed action:

Along a corridor of about 187 miles, the proposed route crosses and consequently has a visual impact upon 25 miles of landscape having high scenic value and 29 miles of moderate scenic value. The remainder passes through areas of low scenic value. (See Map No. 8.) The frequency and length of time that people will be visually impacted by the power line can be roughly measured by the following statistics:

# RELATIVE SCENIC VALUES

A– High Volues
B– Moderate Volues
All Other – Low Values
– – – Proposed Route

MAP No. 8



| | |
|---|---|
| Residences within 1 mile of proposed line (No.) | 8,675 |
| Primary highway crossings | 6 |
| No. of vehicles per day | 47,306 |
| Primary highway-parallel exposure (Miles) | 2 |
| No. of vehicles per day | 5,344 |
| Primary highways - total annual viewing time - (man-hrs.) | 697,186 |

Following are possible visual impacts:

(1) Preconstruction. - The field survey could have a significant visual impact depending on: whether or not the survey crews keep their vehicles on existing roads; the extent of removal of vegetation to establish survey lines; and the type and extent of survey markers used.

(2) Construction. - The following environmental impacts could result from the construction phases of the power line:

(a) Roads and Trails. The roads and trails developed and used during construction present the greatest visual threat to the area. As a result of improved access, there is a possibility of increased damage from unauthorized off-road vehicle use.

(b) Towers and Powerlines. The towers and powerlines present a significant visual intrusion, especially in situations where they are skylined or where they cross roads or run parallel to a road. The surface disturbances around the base of these towers will have a short-term visual impact until vegetation is reestablished.

(c) Microwave Repeater Stations. Repeater stations will be located in areas of present or past communication site use, and additional visual impact is considered insignificant.

(d) Construction Camps. Surface disturbance associated with construction camps and storage of materials could create visual eyesores. No construction camps are proposed for location on applied for lands.

(e) Material Sites. The removal of surface materials for gravel or fill will create visual disturbances which could have long-term impacts.

(3) Operation and Maintenance. - Continued use of equipment to maintain lines, towers, repeater stations, etc., could necessitate keeping some roads open and could result in creation of new trails when emergency repairs are necessary.

c. Mitigating measures included in the proposal:

Criteria proposed by TG&E for the control of visual impacts are outlined in Appendix 10.

d. Additional mitigating measures to be included:

The Department will make the stipulations set out in Appendix 6 of this environmental statement a part of the right-of-way grant, should favorable action be taken on the application. Section H-11 relates directly to the protection of aesthetic values. Other stipulations which relate to control of construction activities relate indirectly to the protection of aesthetic values.

e. Unavoidable adverse effects:

The physical presence of the towers and transmission lines will have an adverse effect on the scenic values through most of the corridor area during the life of the project. The scars from road construction, site clearing, and vehicle use will remain for many years. Possibly, one of the most severe adverse effects would result from continued use of newly constructed roads and trails by off-road vehicle users and the resultant web of trails which frequently accompanies this type of use. Structures such as microwave repeater stations and substations infringe upon the visual environment regardless of the measures taken to harmonize them with the existing surroundings.

2. Sound

a. Description of existing environment:

The sound environment along the proposed corridor varies with the degree of urbanization. In the more urbanized areas, most of the sounds of the city are present, such as vehicles, airplanes, sirens, etc. Except for highway crossings, most of the route covers remote country which is seldom frequented by man. Consequently, sound is limited to that created by wind, water, animals, and airplanes. Where the corridor parallels existing power lines, there is a hum from the transmission lines.

b. Environmental impact of proposed action:

(1) Preconstruction: There will be a limited amount of sound generated by the use of survey vehicles. The impact is of such a temporary duration and of such low magnitude that it is not considered significant.

(2) Construction: The use of motorized vehicles will have a temporary impact on the sound environment, as will blasting and associated construction activities. These activities are of such a short duration and the location of the proposed line is far enough away from urbanized areas that the impact will be nominal.

(3) Operation and Maintenance:

(a) Transmission Lines. - There are some sound effects that are inherent in the overhead transmission of power at high voltage. The effects that could have an impact on the sound environment are the audible noise due to conductor corona and radio and television interference. TV interference is likely to come more in the form of a blurred picture rather than distortion of the audio portion since electromagnetism tends to affect AM reception more than FM. The TV picture is generated by an AM signal, and the audio by an FM signal. The magnitude of the effect varies with: hardware used, such as conductors; the care exercised during construction; and the air density. Based on the construction proposals (Ref. 4), the following noise impacts have been estimated: (Validity of data was verified by the U.S. Bureau of Reclamation.)

(i) Radio Noise. Using the principles outlined in "Radio Noise Design Guide for High-Voltage Transmission Lines," (Ref. 16), the radio noise performance characteristics of the two line designs proposed for the power lines have been compared with those for other EHV lines operating at 345 kv and higher. For the 345 kv single-circuit, guyed steel tower design used between the El Sol and Vail Substations, the comparison shows that the conductors will operate with a surface gradient of approximately 15.0 kv rms per centimeter, and will produce a fair weather radio noise level at sea level in the range of 34 db above 1 microvolt per meter at a distance of 100 feet from the conductor (i.e., beyond the edge of the right-of-way). At the maximum elevation of the route 3400 feet above sea level, an increase of 3 db is estimated. An additional 1-2 db could be generated from the second line. This is still below the 40 db maximum value recommended by Radio Noise Design Guide for High Voltage Transmission Lines. During inclement weather, power line noise level can be expected to increase by 20 db or more. It is estimated, using climatic data from Tucson and Phoenix, that about 45 days during the year have measurable precipitation, and during these days no more than 6 hours average per rainy day. This results in increased noise levels, over the prescribed standards from the transmission lines, for no more than 270 hours out of 8760 hours annually, or less than 3.1 percent of the time.

(ii) Television Interference effects (TVI) produced by 345 kv transmission line conductors are generally nonexistent. However, any small dielectric gap between conducting parts in the electric field from a transmission line may have sparks induced across the gap and may radiate enough energy to produce TVI. The conducting paths need not be part of the EHV line structure, but can be produced by induced voltages in the hardware of nearby lines, or even in other paths such as fences and metal objects in or near the powerline corridor.

(iii) Audible Noise. With respect to audible noise effects due to conductor corona in foul weather, the proposed transmission lines will not produce audible noise exceeding 50 db (A-weighted network) at the edge of the right-of-way. A sound level of 50 db on the A-weighted network is equivalent to that in an average residence with light traffic 100 feet away. The highest audible noise will be under a misty rain condition, where the corona-caused noise may reach 45 db. This condition will occur most frequently in the unpopulated higher elevations and probably no more than 50 hours per year. Corona noise during typical dry weather will not be measurable above background noise.

(b) Substations. - The audible noise and radio and TV interference will probably be substantially greater at substations. The magnitude of these sound effects depends on the type and quantity of the facilities that will be housed at substations.

(c) Microwave Repeater Stations. - There is no audible noise connected with microwave stations unless standby power (gas operated engines) is used.

c. Mitigating measures included in proposal:

(1) Preconstruction: Impacts are not significant enough to warrant mitigating measures.

(2) Construction: Impacts are not significant enough to warrant mitigating measures.

(3) Operation and Maintenance:

(a) Transmission Lines. - The audible noise, TV, and radio interference connected with transmission lines is principally associated with corona. To minimize the corona effect, TG&E proposes to: . . . design-test line hardware, such as insulator strings and spacers, before specifications are developed for this line, and select hardware which will reduce corona to a minimum.

. . . tension-string conductors using lined pulleys to maintain a smooth conductor surface and good electrical connection of conductors and line hardware to prevent arcing between metal components.

. . . provide all metal-to-metal contacts within the electrical field of the transmission line with a good electrical bond to eliminate gaps to prevent television interference. Any potential source of television interference existing in the powerline corridor will be eliminated.

. . . install a 2-conductor bundle configuration. In addition to minimizing corona and radio noise, the

2-conductor design will minimize audible noise due to corona produced in foul weather. During fair weather, the 2-conductor bundle design will produce practically no audible noise.

(b) Substations. - No mitigating measures have been proposed to minimize the sound effect at substations.

(c) Microwave Repeater Stations. - The sound effects are not significant enough to warrant mitigating measures except possibly for muffling motors connected with auxiliary power sources.

d. Additional mitigating measures to be included:

None are required.

e. Unavoidable adverse effects:

(1) Radio Interference: Fair weather noise level 100 feet from the transmission line at 3400 foot elevation is estimated to be 37 db. This could be increased 20 db or more during inclement weather. A maximum radio noise level of 40 db is recommended (Ref. 6). These effects are partially mitigated by the fact that their duration periods are rather short, and the atmospheric noise generally accompanying wet weather can equal or exceed the noise produced by the conductor. In summary, significant radio interference will occur within 100 feet of the power line during inclement weather.

(2) Television Interference: Reports (Ref. 4) by the

company and other utility companies indicate that generally interference by any of the components of the power delivery system is "non-existent." Poor TV reception by residents who live near the lines is directly proportional to how close the resident is to the edge of the right-of-way, direction of the antenna, strength of the TV signal, and the varying weather conditions. Normally, noise in the TV band will not be a problem. Picture ghosts and signal attenuation could be an effect where antennas are in close proximity of the transmission line.

(3) Audible Noise: The power lines will produce an audible noise up to 47 db during heavy rain. The company has estimated that this condition would not exist more than 50 hours per year. Audible noise from the substations could be somewhat higher and extend for longer periods of time.

## 3. Odors

The odors that are associated with construction, such as emission from motorized vehicles, burning of waste materials, and the gaseous effluents (ozone and nitrogen oxide) produced by conductor corona, will have a limited effect on the environment. The adverse effects from construction activities are considered insignificant because of the dispersed nature and limited time period involved. Some test data indicate that ambient (upwind) ozone levels of 12 to 64 parts per billion (ppb) near 765 kv transmission lines may be increased by 2 to 5 ppb downwind. This is well within 80 ppb (0.08 parts per million) prescribed in the National Primary Air Quality Standard as issued by the Environmental Protection Agency. Measurements were made along 765 kv transmission lines in Indiana, Ohio, West Virginia, and Virginia. Ozone production is generally greater on 765 kv lines than on 345 kv or 500 kv lines at the same altitude and climate conditions. These measurements revealed that only the existing natural background levels of ozone could be detected. The levels are on the order of 1000 times less than the average levels found by the U.S. Department of Health, Education and Welfare in large cities such as Denver, Colorado. As the environmental effect of this proposal is minimal, no mitigating measures are proposed.

4. Taste or Touch:

There are no significant environmental effects associated with the construction or operation of the power line as it relates to taste or touch.

5. Mood - Atmosphere:

a. Description of existing environment:

To describe the mood or atmosphere, the area along the proposed corridor has been classified into four types of environments as follows:

(1) Urbanized Environment: The mood or atmosphere in this environment is dominated by manmade features such as roads, power lines, buildings, etc., and the sound, smell and movement of the city.

(2) Agricultural Environment: The dominant characteristics of this environment are the agricultural fields and associated features such as canals, roads, pump stations, distribution power lines, farm buildings, etc., and the sounds, smells, color, texture, line and form associated with these features.

(3) Wildland Environment: This environment is characterized by predominance of natural features interrupted only by an occasional highway, dirt road or trail.

(4) Primitive Environment: Areas which are predominantly natural, wild, and undeveloped in settings essentially removed from the effects of civilization, as evidenced on Map 9. The basis for Map 9 comes from the Bureau's Primitive Area Evaluation Procedures.

b. Environmental impact of proposed action:

The impact on the mood or atmosphere will be minimal in the urbanized and agricultural areas, somewhat greater in the wildland areas, and substantial in the primitive areas. The impacts will be primarily visual in the form of power lines, towers, roads, trails, and cleared areas; however, the opening of new roads and accompanying vehicular use also introduces new sounds, smells, and sights. These impacts will have a significant effect on the mood in the areas that are presently primitive in nature.

c. Mitigating measures included in proposal:

See the mitigating measures shown in D1c and D2c.

d. Additional mitigating measures to be included:

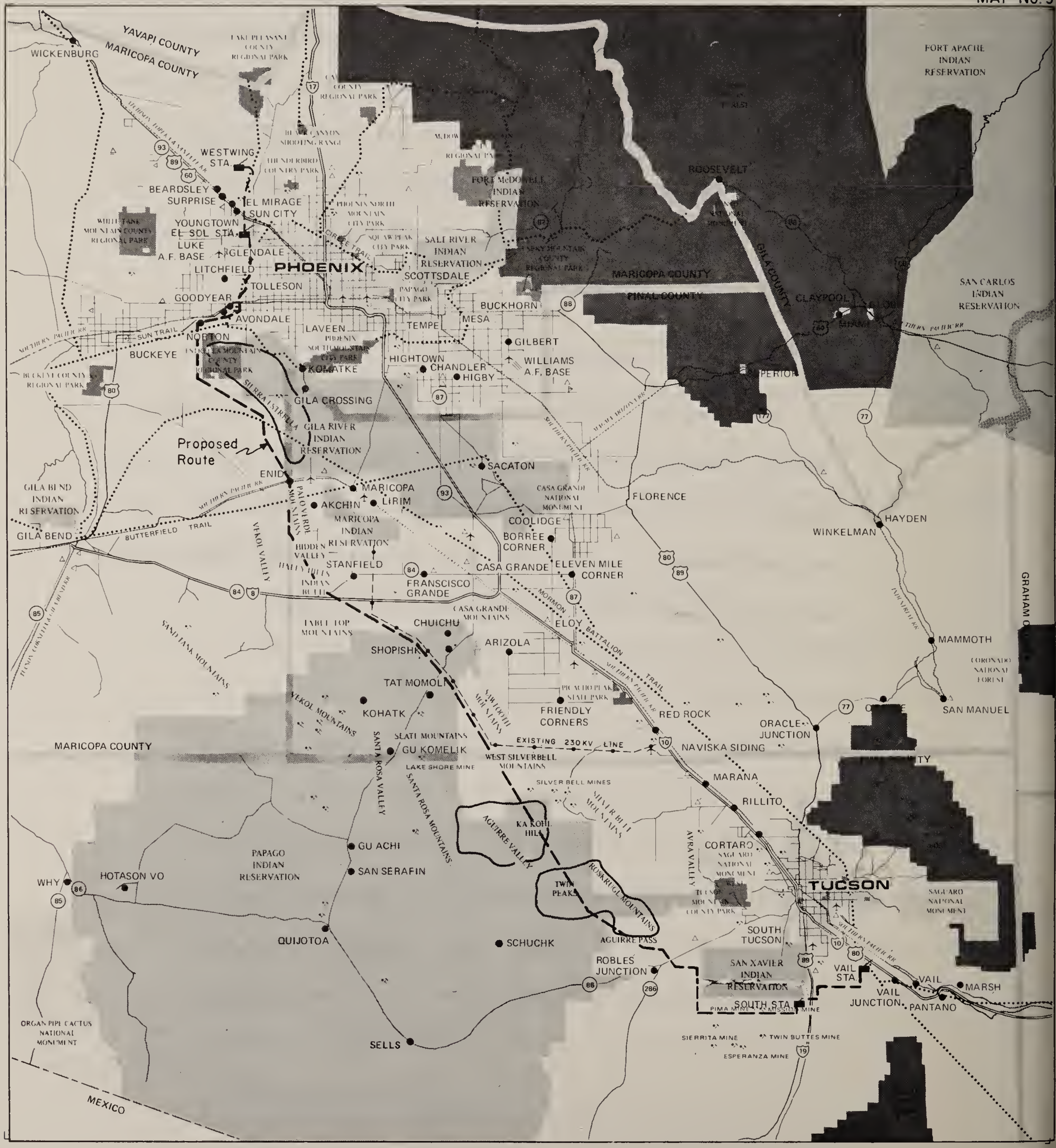
Should the right-of-way application be approved, clearing or grading allowed in the areas shown as primitive (see Map 9) shall be limited to that needed for tower sites. In these areas, towers shall be erected by helicopter if there are no existing access roads to the tower sites. Control of this activity will be exercised through section H-14 of the right-of-way grant (Appendix 6).

e. Unavoidable adverse effects:

The presence of the power line and associated roads, trails, audible noise, etc., will have a long term negative impact on the mood or atmosphere in each of the four types of environment (see Map 9), but the most severe impact will be in the areas that are primitive in nature.

# AREAS ALONG THE PROPOSED ROUTE HAVING PRIMITIVE VALUES

MAP No. 9



## E. Human Interest Values

### 1. Educational and Scientific

a. Description of the existing environment:

(1) Geological. - The area being considered shows a pattern of abrupt, high relief geomorphic features. These appear as barren mountains with little vegetation on their surface and seem to be of igneous origin. The mountains are steep sided and show excellent examples of vertical jointing. These mountains appear to be remnants of earlier subsurface igneous intrusions from which the overlying strata have eroded. The underlying, more resistant igneous remnants now appear as mountains with broad level valley drainages to the north.

(2) Ecological. - Ecological significance of the area is that of a Sonoran Desert with its associated faunal and floral complement, which extends from northern Mexico to the Gila-Salt River Valley. Javelina, desert bighorn sheep, badger, wildcat, fox, coyote, puma, and mule deer are a few of the animals of human interest found in the area.

There are many saguaro "forests" and other cacti within the area of the corridor. Additionally, it should be noted that all vegetation in a desert is of ecological and human interest value by virtue of the general lack of vegetation. The showy plants, such as saguaro, ocotillo, cholla, prickly pear, and other cacti, join with shrubs and trees such as paloverde, ironwood, mesquite, and catclaw on a backdrop of the more numerous and less showy plants such as saltbush, creosote bush and grasses. The relative densities and distributions of these plants vary within the area, including some areas of very sparse distribution of only the very hardy plants.

(3) Archeological. - The proposed route traverses known archeological areas of both recorded and undetermined scientific values. The areas of undetermined value have, at best, very little archeological work done on them. There has been no large scale reconnaissance of the area influenced by the proposed transmission line. The sites presently recorded have been surveyed on the basis of specific site search, salvage of endangered sites, and a small amount of scientific academic interest.

From El Sol Substation south, the line follows the Agua Fria River for several miles. The Agua Fria region has proved to be one of the most significant archeological regions in the central Arizona area. Excavations at sites farther upstream have provided cultural indicators and chronological information which form the basis of what is known about certain elements of southwestern cultures. The existence of sites along the Agua Fria is a probable fact, given that the area was part of a major prehistoric culture center. The fact that agriculture has disturbed many of these sites adds much to the potential value of undiscovered, undisturbed sites.

The Gila River and the area of its confluence with the Agua Fria is an area of extraordinary probable importance. The Gila's water resources were heavily exploited by prehistoric dwellers of the area. The banks of this river are an area of rich archeologic potential. It has been estimated that at no point on its banks are you out of sight of an area of prehistoric use--a habitation site, an agricultural terrace or field, or field camp.

Cursory examination of high level photos of the proposed route reveal the existence of cultural features on the south bank of the Gila on the immediate upstream and downstream borders of the corridor. Large sites are known to exist in the near vicinity, including one site notable for its damage by vandals.

From the Gila River south, the route crosses an area of mountains separated by broad flat areas with intermittent streams draining generally to the north. Within this area occur an unknown number of sites which have been used by present day Papago Indians and others back to 10,000 or more years ago. These sites range from larger agriculture related sites along watercourses, to ephemeral campsites used at times wild plant fruits were gathered. Many trails also cross this land which were used prehistorically in travel for hunting and gathering of foods, trading, and for communications between culture subgroups. These trails are scientifically valuable for their antiquity and are extremely fragile.

An archeological survey of the proposed route was completed on June 15, 1974. Appendix 14 contains the abstract and table 1 from that report. Table 1 describes each of the archeological sites found.

(4) Hydrological. - No geysers, unusual lakes, or known hot springs or mineral springs exist within the area of the proposed powerline route. The dry beds of numerous arroyos are hydrological in nature but their human interest should not be high because of their common occurrence. Of possible hydrological human interest are the charcos and small playas of the area. The possibility of paleontological remains associated with these pleistocene phenomena have also been authenticated in southern Arizona, including the Tucson area.

b. Environmental impact of proposed action:

The impact on geological and hydrological features is not considered significant enough to justify additional explanation.

The impact on ecological values is discussed in detail in sections B1, B2, and D1. Consequently the remainder of this section is restricted to discussing the impacts on the archeological values.

(1) Power System Design Impacts. - Assuming that the field survey crews use existing roads and trails as much as possible, the impacts during the design phase should be minimal. The greatest potential danger could be looting or vandalism if an archeological site were discovered during field activities.

(2) Power System Construction Impacts.- Physical destruction of archeological sites by roads and tower sites could be a primary source of damage, followed by illegal excavations and vandalism to sites. Secondary considerations are damage by erosion caused by construction related surface disturbance and watercourse diversion. The siting of power line towers and the power lines next to or even fairly close to archeological sites will degrade the educational and scientific human interest values. Additional damage could also occur if recreation enthusiasts and/or vandals damage the sites while collecting prehistoric artifacts. Attendant to the improved access provided by construction access roads and trails is increased recreational use of the area and of the prehistoric trails used thousands of years ago for communications between culture groups. Tower site location is of critical importance, since a tower erected over the

site of a prehistoric use feature will destroy its value for scientific and recreational uses. Drilling for the tower guy anchors could be of equal destructiveness, since drilling will disrupt the all-important stratigraphy of a site. The piling of drill-excavated earth, together with associated cultural material, could increase the threat of artifact collecting and total site destruction.

(3) Power System Operation and Maintenance Impacts. - Continued use of roads and trails for maintenance purposes would tend to keep access open for recreational users and create the attendant impacts as mentioned in (2) above.

c. Mitigating measures included in proposal:

(1) Power System Design. - Archeologists have been consulted to locate and identify archeological sites in the area. In the final location of the centerline, areas of archeological value will be identified by qualified archeological consultants from the Arizona State Museum and avoided.

(2) Power System Construction Phase. - Construction crews will be given preconstruction education on the do's and don'ts of construction in relation to archeological sites. In the event that any Indian relics or items with any apparent archeological or historical values are discovered during construction of the line, these relics or items shall not be touched, moved, or otherwise disturbed. Title to any relics, artifacts, fossils, or other items of historical or archeological value is expressly

reserved in the landowner or agency having jurisdiction. Arrangements will be made with the Arizona State Museum to conduct archeological surveys and excavation where needed within and adjacent to the right-of-way for the power line. Once the right-of-way has been established and work on the line begins, all construction activities on roads, construction camps, towers, and other potentially destructive actions, will be conducted in a manner so as to avoid any sites still remaining nearby. State and Federal regulations regarding archeological resources will be followed in all cases.

(3) Power System Operation and Maintenance Phase. - Surveillance will be primarily by aircraft, with surface action only as needed. Surface transportation will utilize previously agreed upon routes, consisting of existing roads and trails which had previously been cleared of archeological values.

d. Additional mitigating measures to be included:

The following will be included if the right-of-way application is approved:

(1) Power System Design Phase. - Section H-12 of the proposed permit (Appendix 6) requires that an archeological survey be completed prior to construction. Sufficient lead time must be included to allow for analysis and reporting of the archeological work and still have ample time to make any needed route changes. Initial reconnaissance will include the entire corridor area. The examination of an area larger than the immediate right-of-way proposal could reveal related features which could be of

significant importance and which could be impacted by increased accessibility resulting from power line development. Archeological workers should attempt to minimize motor vehicle use in reconnaissance, and utilization of existing roads must be emphasized in preference to off-road travel wherever possible. This mitigating proposal is in addition to the company's proposal to utilize archeologists in the field engineering surveys to minimize impacts on archeological resources in the corridor.

(2) Power System Construction Phase. - An archeologist will be employed by the applicant for the purpose of monitoring construction activities regarding archeology and archeological-paleontological matters. A corollary duty of an archeologist could be to perform salvage of appropriate sites as necessary. The archeologist should report to appropriate property owners and to the Tucson Gas & Electric Company at agreed-upon intervals. Written archeological reports should cover the activities of the archeologist during the reporting period, progress of the power line construction, archeological activities pursued, and any violations of permit stipulations regarding antiquities.

(3) Power System Operation and Maintenance Phase.- The applicant proposes to use helicopter or fixed wing aircraft to patrol and perform minor maintenance of the powerline and attendant communications facilities. Significant maintenance will be done by ground crews. No additional mitigating measures are required.

e. Unavoidable adverse effects:

Regardless of the intensity of the archeological inventory, the thoroughness of enforcement of the stipulations, or the post construction controls on the use of new or improved roads, there will be unavoidable losses in archeological values. Losses will occur in two forms -- first, the loss of scientific information due to manipulation of the stratigraphy; and second, a degradation of human interest value due to the presence of power line structures and roads which are not in keeping with the original setting.

2. Historical

a. Description of the existing environment:

Following is a listing of historical features of the area crossed by the proposed power line. (See Map 10.)

(1) Related to Persons.- Baron of Arizona marker just east of Montezuma Head, a peak at the southernmost end of the Estrella Mountains.

(2) Related to Events. - Litchfield Park, Arizona, will be nominated to National Register of Historic Places as a memorial to Community Planning.

The Gila River itself is important to the history of the area and is of national significance, since it was the south boundary of the United States before the Gadsden Purchase of 1853.

(3) Related to Religions and Cultures. - Santa Ana Mission was the most recent, farthest north, and a relatively extensive mission of the Franciscan Order in Arizona. No structural remains are left standing but some information has been gathered by the University of Arizona.

(4) Related to the Western Frontier. - Irrigation canals in the Phoenix area which are crossed by the proposed power line route are valuable as an illustration of the activities of early Arizona settlers. The proposed line crosses canals which are still actively used though they are often quite old.

There are many historic mines, both active and inactive,

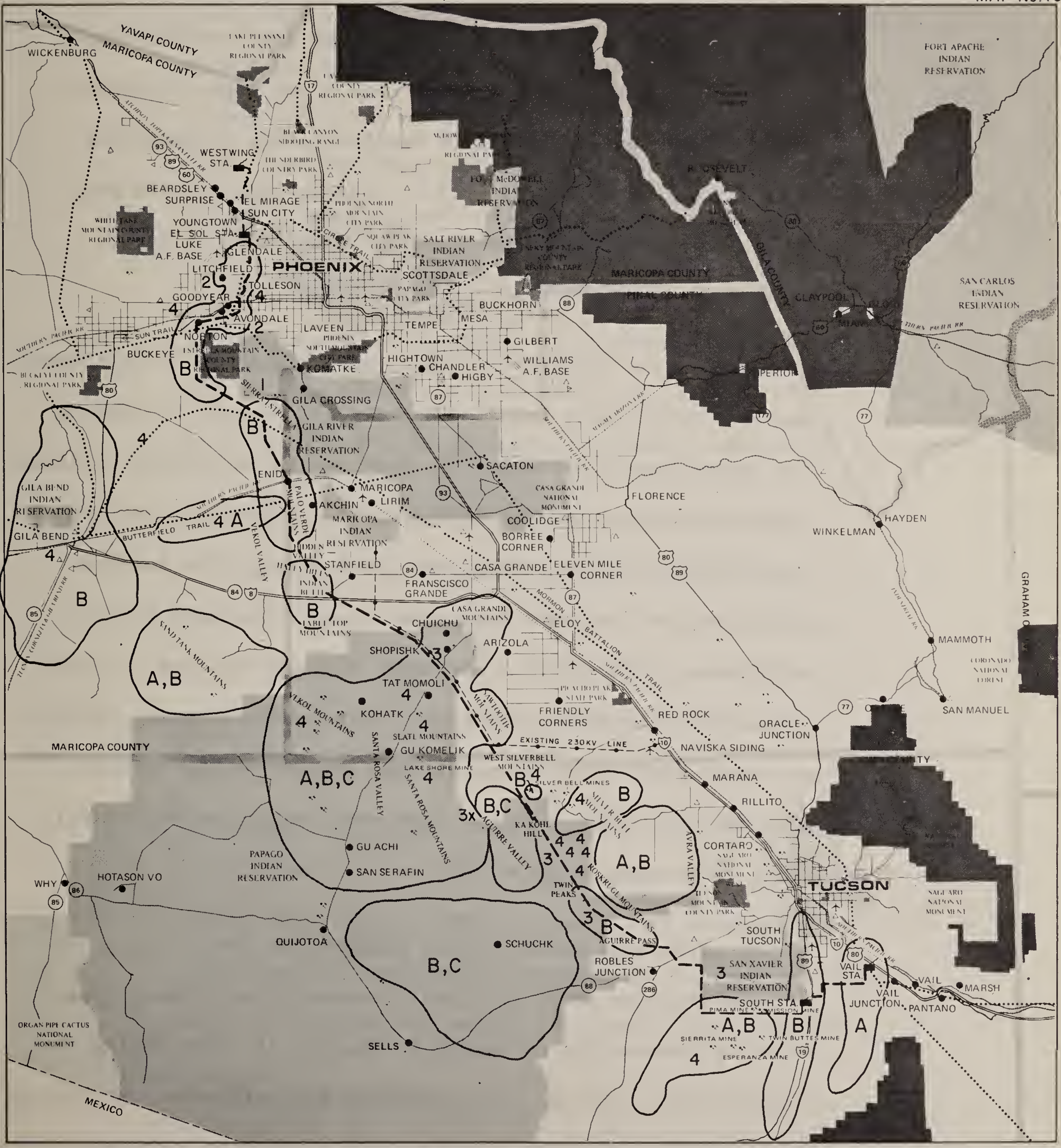
# HISTORICAL FEATURES ALONG THE PROPOSED ROUTE

A – Area of Prehistoric Trails
B – Probable Archeological Sites
C – Area of Possible Paleontology Values
– – – Proposed Route

1 – Related to Persons
2 – Related to Events
3 – Related to Religions and Cultures
3x – Santa Ana Mission
4 – Related to Western Frontier

FOR DETAILS OF NUMBERED KEY, SEE HUMAN INTEREST & HISTORICAL

MAP No. 10



in the mountains adjacent to the proposed corridor.

The Butterfield Stage Line followed a trail from Maricopa Wells through the Rainbow Valley and the Maricopa Mountains to Gila Bend. There is evidence that a way station existed along the Butterfield Trail in Rainbow Valley although the site has not been located. If a stage station of this era could be located and authenticated, it would be an important addition to the history of the State.

Besides the Butterfield Stage, many travelers to California used the Butterfield Trail. The area was crossed in 1846 by the famous Mormon Battalion on their way to California to fight a war which ended before their arrival. Finally, the most important use of the Butterfield Trail through the Rainbow Valley was to construct a railroad along a southern route to California. The railroad was built through the area in 1880, long after the Gadsden Purchase. This southern route, in fact, has often been cited as one of the reasons for the Mexican-American War. This railroad ended the era of the Butterfield Trail as a cross country link.

b. Environmental impact of the proposed action:

The proposed power line could impact these historic features by destruction or damage to historical sites during preconstruction, construction, operation and maintenance activities. Motor vehicle operation, construction excavation, grading, blasting, clearing of the right-of-way, and the resultant roads themselves are a potential threat to the integrity of historical sites. Visual impact of the powerline upon historical sites will degrade human interest values. More roads into the area will enable vandals, collectors, and others to reach sites previously inaccessible.

c. Mitigating measures included in the proposal:

Historic sites located in the general corridor area will be identified and preserved in accordance with mitigating measures listed under sections discussing archeological values.

d. Additional mitigating measures to be included:

The mitigating measures outlined in sections Elc and Eld are applicable to historic values. A thorough literature search has been made for the area within and adjacent to the proposed corridor. In addition, should the right-of-way application be approved, a ground search for possible historic sites will be included in the preconstruction archeological reconnaissance. The archeologist employed to observe and assist the contractor during the construction phase will perform a similar service for the historic values. Historic sites will be avoided in the location of the powerline.

e. Unavoidable adverse effects:

The construction of the powerline and accompanying roads, construction sites, etc., will have an adverse effect on the historic setting and the integrity of the historic value and could destroy physical remains of such sites. The increased access resulting from road and trail development will increase vandalism, pot hunting, etc.

## 3. Cultural

Special emphasis must be given to cultural interests of peoples other than the dominant American culture. The only culture of this nature affected by the proposed corridor is the Papago Indian culture. There are no known culturally important sites or areas along the proposed route. Native American groups, by virtue of their religions, heritage, and folklore, have special considerations for certain places, features, and areas. These places are known only to themselves and are usually guarded secrets. Desecration of these sites, though unintentional, must be avoided.

Indian lands within the Reservation are trust lands and have the status of private ownership, with the Secretary of the Interior acting as Trustee. Although the Secretary of the Interior has the authority to grant a right-of-way across Indian reservation lands (see Appendix 1), such a grant cannot be made without the consent of the local Indian people.

## F. Summary of Unavoidable Adverse Effects

Even after implementing all mitigating measures, there will still be a number of adverse impacts resulting from the construction, operation, and maintenance of this power line and associated facilities. The following is a summary of the adverse effects that are expected if the necessary permits are granted and the lines are constructed.

1. Unavoidable land-use adverse environmental effects will take the following forms:
    a. The placement of this corridor in areas not presently devoted to this use will probably, in the foreseeable future, commit these lands to an industrial type use (attract other utilities or power companies to use this corridor or locate adjacent to it). There is also a loss of aesthetic natural beauty.
    b. It will take at least 4.5 acres of agricultural land out of production. During construction, about 10 acres will be nonproductive when access roads are in use.
    c. There will be a certain degree of radio and television interference in homes located near the line and in auto radios passing under the line at the several road crossings.
    d. There will be a temporary disturbance of wildlife territorial habitat and movement until construction is completed.

e. There will be a temporary loss of livestock feed for at least a 5-year period while the native plant life reestablishes itself or while reseeded areas become established.

f. There may be a loss in value of lands being subdivided or held for speculative appreciation, that are traversed by or are adjacent to this corridor. This loss may be magnified if other utilities are attracted to the corridor.

g. Remote roadless primitive areas, mainly on the Indian reservation, will be more readily susceptible to human encroachment. This may interfere with Indian cultures.

h. Transmission line rights-of-way have historically been the dumping grounds for indiscriminate dumpers. Dumping will probably occur along this corridor.

2. Unavoidable adverse effects on the land will include:

a. There will be both wind and water activated soil erosion during the construction period. Movement of construction vehicles in erecting transmission towers and stringing conductors will break the natural surface soil crust and expose the unconsolidated soils to movement. Depressions from vehicles will provide channels on slopes for more rapid runoff during intense storms experienced in the area. There should be a gradual decrease in soil erosion as the estimated 15-year period required to reach complete vegetative rehabilitation is approached.

b. There will be a loss of vegetation, estimated to be about

4000 kilograms per acre per year. This loss will decrease as the effects of rehabilitation take place. Also lost with the vegetation is its soil holding capacity and its contribution to the natural life processes.

c. There will be some diversions of normal watershed runoff due to road construction. This change could alter the existing patterns of vegetative growth.

3. Unavoidable adverse effects on water:

There should be no unavoidable adverse effects on water resources during the construction of these transmission lines. An accidental waste spill would be the only exception.

4. Unavoidable adverse effects on air:

Surface disturbance will add particulates to the air. Vision may be lessened in the immediate corridor area. There will also be a small but insignificant emission of oxidants through the corona phenomenon along the conductors.

5. Unavoidable adverse effects on plants:

Provided all mitigating measures are followed, the proposal will result in the temporary disturbance of about 326 acres of natural vegetation by roads and staging areas. In addition, less than 1 acre of land would be removed from vegetative production for use as tower bases and guyline bases.

6. Unavoidable adverse effects on animals:

   a. Removal and disturbance of approximately 500 acres of habitat for a period of about 5 years.

   b. Large numbers of small animals may be killed during construction. The effect will probably extend no more than a 5-year period and probably much less. Due to the short life cycles, these small animals should increase rapidly to near original levels.

   c. Noise and construction activities will temporarily cause some biological stress and force large mammals to temporarily alter travel routes and other habits.

   d. Tower bases and other permanent structures will take out of production less than one acre of habitat.

7. Unavoidable adverse effects on ecological interrelationships:

   None of significance.

8. Unavoidable adverse effects on aesthetics:

   The physical presence of the towers and transmission lines will have an adverse effect on the scenic values through most of the corridor area during the life of the project. The scars from road construction, site clearing, and vehicle use will remain for many years. Possibly one of the most severe adverse effects would result from continued use of newly constructed roads and trails by off-road vehicle users and the resultant web of trails which frequently accompanies this type of use.

Structures such as microwave repeater stations and substations infringe upon the visual environment regardless of the measures taken to harmonize them with the existing surroundings.

9. Unavoidable adverse effects on sound:
   a. Radio Interference: Fair weather noise level 100 feet from the transmission line at 3400 foot elevation is estimated to be 37 db. This could be increased 20 db or more during inclement weather. A maximum radio noise level of 40 db is recommended (Ref. 16). These effects are partially mitigated by the fact that their duration periods are rather short, and the atmospheric noise generally accompanying wet weather can equal or exceed the noise produced by the conductor.
   b. Television Interference: Reports (Ref. 4) by the company and other utility companies indicate that generally interference by any of the components of the power delivery system is "nonexistent;" yet power companies apparently receive numerous complaints concerning poor TV reception by residents who live near the lines. With 8,675 residences located within 1 mile of the proposed corridor, this could result in a rather substantial problem.
   c. Audible Noise: The power lines will produce an audible noise below 50 db during heavy rain. The company has estimated that this condition would not exist more than 50 hours per year. Audible noise from the substations could be somewhat higher and extend for longer periods of time.

10. Unavoidable adverse effects on odors:

The odors that are associated with construction, such as emission from motorized vehicles, burning of waste materials, and the gaseous effluents (ozone and nitrogen oxide) produced by conductor corona, will have a limited effect on the environment. The adverse effects from construction activities are considered insignificant because of the dispersed nature and limited time period involved. Some test data indicate that ambient (upwind) ozone levels of 12 to 64 parts per billion (ppb) near 765 kv transmission lines may be increased by 2 to 5 ppb downwind. This is well within 80 ppb prescribed in the National Primary Air Quality Standard as issued by the Environmental Protection Agency. Measurements were made along 765 kv transmission lines in Indiana, Ohio, West Virginia, and Virginia. Ozone production is generally greater on 765 kv lines than on 345 kv or 500 kv lines at the same altitude and climate conditions. These measurements revealed that only the existing natural background levels of ozone could be detected. The levels are on the order of 1000 times less than the average levels found by the U.S. Department of Health, Education and Welfare in large cities such as Denver, Colorado. As the environmental effect of this proposal is minimal, no mitigating measures are proposed.

11. Unavoidable adverse effects on taste or touch:

There are no significant environmental effects associated with the construction or operation of the powerline as it relates to taste or touch.

12. Unavoidable adverse effects on mood-atmosphere:

The presence of the power line and associated roads, trails, audible noise, etc., will have a long term negative impact on the mood or atmosphere in each of the four types of environment (see Map 9 ), but the most severe impact will be in the areas that are primitive in nature.

13. Unavoidable adverse effects on human interest values:

a. Regardless of the intensity of the archeological inventory, the thoroughness of enforcement of the stipulations, or the post construction controls on the use of new or improved roads, there will be unavoidable losses in archeological values. Losses will occur in two forms -- first, the loss of scientific information due to manipulation of the stratigraphy; and second, a degradation of human interest value due to the presence of power line structures and roads which are not in keeping with the original setting.

b. The construction of the power line and accompanying roads, construction sites, etc., will have an adverse effect on the historic setting and the integrity of the historic value and could destroy physical remains of such sites. The increased access resulting from road and trail development will increase vandalism, pot hunting, etc.

c. The only culture affected by the proposed corridor is the Papago Indian culture. There are no known culturally important sites or areas along the proposed route.

## III - RELATIONSHIP BETWEEN SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE OF LONG-TERM PRODUCTIVITY

For purposes of this analysis, the life span of the transmission line system (50 years) is considered a short-term period. Long-term productivity is considered as productivity that extends beyond the life span of the transmission line.

The long-term productivity of the non-living components (land, water, air) within the transmission line right-of-way and its zone of influence will not be affected by the short-term use of these components for a transmission line project.

The land space will be available, and the soil, water, and air characteristics will not be physically altered or removed. Physically, they will be available for long-term productivity the same as for short-term use.

The long-term productivity of living components (plants, animals, humans) within the zone of influence of the right-of-way will not be adversely affected by the proposed short-term use of the zone for a right-of-way.

Long term aesthetic values will be adversely affected by the scarring effects of the construction, operation, and removal of the transmission system for short-term uses. Impacts will vary from minimal in areas close to human habitation, to severe in areas that are presently wild lands. Even though special efforts will be taken to maintain a wild land environment by limiting access routes, the increasingly popular use of off-road vehicles, four-wheel drive vehicles, and motorcycles will have a detrimental intrusion effect upon the area because of the improved access.

Because of the requirements that archeological investigations be made prior to construction, short-term use will have minimum negative impacts upon human archeological interests. Archeological knowledge in the area will be accelerated, and the cumulative impact for the long term will be positive.

In summary, short-term uses of the right-of-way will have very little impact upon long-term productivity of the right-of-way or of its zone of influence.

## IV - IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Very few irreversible and irretrievable commitments of resources have been identified. The major impact is a commitment of space for land use as a transmission corridor. However, this use is a short-term use which is compatible with many other land resource uses and is not considered irreversible and irretrievable.

The increased human activity within the impact zone of the transmission line corridor will have an irreversible impact upon the wild character of the area. Introduction of manmade structures, including towers and roads, will forever change the basic character of some of the land from a natural wild area to that of an area which is marked by human use. Those segments of the corridor which are essentially wild will be subject to an increased level of human activity. Although the entire length of the corridor is presently accessible, the more remote areas are subject to a low level of human activity because few roads exist. An increased number of roads will cause an increase in human activity, thereby irreversibly changing the general character of the area. Construction of the transmission line will have an irreversible negative effect upon the natural beauty of the wild areas as well as its general character. Even after the structures are removed, the scars of human use will have irreversibly marked the area.

There is no evidence to indicate that the increased level of human activity would have an irreversible effect upon any of the flora or fauna of the area. There will be some soil disturbances, but none of such a consequence that the disturbance can be considered irreversible or irretrievable.

The resources used in the actual construction will be largely irretrievable except for a limited salvage value. Materials used will include such items as steel for the towers, hardware, and conductor core, aluminum for the conductors, and concrete for the tower bases. All support costs for the project, such as fuel, equipment, and personnel salary must also be considered as an irretrievable commitment of scarce resources. TG&E estimates the commitment at 12 million dollars.

The primary commitment of resources was the decision to proceed with power generation and distribution from the Navajo Power Plant. The decision to proceed was covered by Final Environmental Impact Statement FES 72-1 titled Navajo Project, prepared by the Bureau of Reclamation, U.S. Department of the Interior on February 4, 1972 (Ref. 15). The 500 kv transmission lines providing for the distribution of power from the Navajo Power Plant to Westwing Substation (Phoenix, Arizona) were also described.

# V - ALTERNATIVES

A number of alternatives have been considered in the location of this transmission line corridor. They consist of means that can be utilized to transmit Tucson Gas & Electric Company's share of the power generated at the Navajo Thermal-Electric Generating Plant arriving at the Westwing Substation, to be transmitted to TG&E's Vail Substation at Tucson. The alternatives for power generation for the Navajo Plant are thoroughly discussed in the Final Environmental Statement on the Navajo Project, issued by the Bureau of Reclamation, U.S. Department of the Interior (Ref. 15).

## A. Alternative Routes

The alternate routes that were considered are shown on Map No. 5.

There are two factors having about the same impact that are common to all the alternate routes being considered. First, each route would enter and open up a rather primitive and roadless area to human encroachment. The negative effects are the further displacement of wildlife, destruction of primitive values, and encroachment on peoples who prize the solitude and life style they have enjoyed in the past. About the only benefits that a corridor will bring is that (1) new access will make more remote areas accessible to hunters and recreationists, and (2) it may provide easier access to reach and control wild fires. The second factor is that each of these routes is located in or near rivers or major drainages where primitive peoples chose to live and develop their cultures because of the availability of water. Powerline construction will necessitate archeological investigations and provide easier access to artifact hunters and encourage depredation of unprotected sites.

### 1. Route No. 1

This route goes directly east from the Westwing Substation, across I-17 to about Scottsdale Road, where it would make about a 45° turn toward the southeast. It would then go through Paradise Valley, across the Salt River Indian Reservation, and across roughly 35 miles of agricultural lands to pass 5 miles west of Florence, Arizona. The next 16 miles would cross deep alluvial materials cut by broad shallow east-west trending washes to a point where the township line between Ranges 10 and 11 East is reached. From this point, this alternate route would proceed directly south along the township line through some of the heaviest concentrations of lush desert vegetation found in the State. It is one of those areas which the BLM has identified as valuable for preservation for its natural beauty and recreational potentials. This area is also encumbered with mining claims.

After crossing I-10, Alternate Route No. 1 would pass across agricultural lands and follow Brawley Wash through the Avra Valley until it would reach and follow the route proposed by TG&E the remainder of the way to the Vail Substation.

Alternative Route No. 1 appears to afford about the same amount of risk of soil erosion and soil pollution as the proposed route. Soil erosion factors appear to be more critical in that portion lying between Florence and the crossing at I-10 where the disturbance of the abundant vegetation could generate a great amount of erosion potential. A large part of this alternate route is across lands which have more slope and are more susceptible to erosion than the proposed route, which is located mostly in nearly flat areas. There would be a greater impact on agricultural uses since this route would traverse at least 10 times as much agricultural land with a correspondingly greater loss of crop production. It appears that radio interference from this route would be approximately the same as the proposed route. There would be visual impact on the recreational use and development of the Picacho Flats area if this route were chosen. The impacts on water and air would be approximately the same as with the proposed route.

The Salt River Indians do not want this corridor to pass through their lands.

### 2. Route No. 2

This route is essentially the same as Route No. 1 except that where Route No. 1 crosses I-10 near Marana Air Park, Route No. 2 turns to the southeast and would run parallel to I-10 into the developed area of Tucson. It would then bear south and follow the Santa Cruz River channel through the west edge of Tucson, into the San Xavier Indian Reservation, to a point near the Reservation's southeast corner, where it would join the continuation of the route to Vail Substation.

This route would avoid the agricultural lands lying south of I-10 crossed by Route No. 1. However, it would parallel two existing TG&E 138 kv lines along I-10. Possibly the additional visual impact from the road would not be significantly worsened by two more sets of towers. The greatest impact would be the radio interference and visual impact in Tucson proper. This impact might be minimized, since this corridor would be in the Santa Cruz River channel, and it is a more industrialized part of Tucson. Essentially, this corridor would lie within easy view of the traveling public and Tucson residents for about 33 miles of its length.

Like Route No. 1, the Salt River Indians do not want the northern segment to cross their lands.

### 3. Route No. 3

This route is identical to TG&E's proposed route from the El Sol Substation to a point where the proposed corridor bears west to go around the Estrella County Park. Route 3 would then turn to the southeast and head toward a point at the northwest corner of the Gila River Indian Reservation. From there it would head in a more easterly direction across the Reservation to a point near the southwest end of the South Mountains where an easterly course would be taken along the township line which is a northern boundary of the Reservation. Continuing east along the township line, Route 3 would touch the south end of Chandler and proceed east until it reached the Southern Pacific Railroad tracks. From there it would follow the railroad tracks in a southeasterly direction until it would intersect with the corridor suggested in Alternative No. 1 on the west side of Florence. Most all of the lands traversed after this route leaves the Reservation are in agricultural production (about 26 miles). The remainder of Route 3 is identical to Route No. 1.

The impacts of this route are essentially the same as Route 1, except that there would be an increased impact on land uses in the urbanizing areas in the western Phoenix Metropolitan area. The corridor would be exposed to frequent public view as it skirted the west and south sides of Phoenix and agricultural area south of Chandler.

The Gila River Indian Community has indicated opposition to the construction of transmission lines across the Gila River Indian Reservation (August 22, 1972, letter to TG&E). The principal reason given for this position was that the residents did not want the landscape spoiled by transmission lines and towers. The Community also indicated a desire to preserve all the mountain areas in their original condition.

Arizona Department of Game and Fish pointed out that Route No. 3 would intrude on dove nesting areas.

### 4. Route No. 4

This alternative is a variation of Route No. 3 that does not follow the Gila River Reservation northern boundary along the township line. From the southwest end of the South Mountains, it takes a direct southeasterly route for about 35 miles adjacent to an existing Bureau of Reclamation 115 kv transmission line. The existing corridor is located north of the Gila River channel until it passes Gila Butte where it is located in the flood plains. It leaves the flood plains about 2 miles from the eastern edge of the Gila Reservation and then crosses the river about 3 miles east of the Reservation. It joins Route No. 3 south of Florence.

This alignment along an existing powerline would seem to be a preferred choice over the segment of Route 3 that it replaces. Visual impact and operational maintenance factors would seem to be less than the Route No. 3 segment. The impact on the agricultural lands would be eliminated.

The Gila River Indian Community has identified adverse impacts associated with transmission line construction on their reservation (see Alt. #3).

Other than the exceptions discussed above, this route would have essentially the same impacts as Route No. 3.

## 5. Route No. 5

This route is identical to the one proposed by TG&E from El Sol down to the point where TG&E's route bears to the east to go in closer to the Estrella Mountains before it again turns south toward the Palo Verde Mountains. The two then run together until they reach the Haley Hills where Alternative No. 5 turns away from the proposed corridor and goes directly to the point where both again parallel the existing Arizona Public Service 230 kv line to the point where the latter turns east toward the Saguaro Power Plant. Route 5 also turns east along the APS line for about 8 miles and then veers to the southeast along a path which passes between Ragged Top and Silver Bell Mountains. After crossing the Silver Bell road, this route takes a more southerly direction along the east edge of the Roskruge Mountains and then joins the TG&E proposed route about 3 miles east of the San Xavier Indian Reservation, to continue on to the Vail Substation.

In addition to having the impacts that would be associated with the corridor proposed by TG&E, this route would (1) impact about 5 miles of agriculturally productive lands lying southwest of the Maricopa Indian Reservation; (2) traverse about 20 miles of rough and mountainous country as it passed through the Silver Bell - Roskruge Mountain chain. This activity would trigger much soil erosion because of the required clearing, road building, and site preparation for individual tower erection. Further, this route would (3) have a great deal of conflicts with mining claimants;

and (4) cause lasting surface scars in an area which still contains much natural beauty in spite of the mining activity going on there.

### 6. Route No. 6

This route follows the same path as Routes 3 and 4 from the El Sol Substation, except that it goes directly south along the westerly border of the Gila River Indian Reservation after passing by the very northwest corner of the Reservation. It proceeds south on the east edge of the Estrella Mountains for about 3 miles and then veers to the southeast, taking a path between the Gila River and the Estrella Mountains, until it reaches the southern border of the Reservation. At that point, a due south route is taken that passes through agricultural lands lying west and south of the Maricopa Indian Reservation. Just north of State Route 84, Alternative No. 6 turns to the southeast for about 8 miles after which it passes through the Papago Indian Reservation in a general southerly direction. It then goes on the west side of Tat Momoli and Slate Mountains and then veers east to pass on the east side of the Santa Rosa Mountains. A more easterly direction is taken that passes along Aguirre Wash, through Aguirre Pass, and then this route joins the TG&E proposed route that continues on to the Vail Substation.

This alternative would have a great deal of impact on the lands and peoples of the Gila River and Papago Indian Reservations. It would open a vast amount of primitive land to outside intrusion.

There would be a moderate impact on the dove nesting areas east of the Estrellas. A corridor there would be quite an intrusion upon the Reservations.

There would also be an impact upon approximately 7 miles of agricultural lands that would be crossed by this route along that segment west of the Maricopa Indian Reservation.

The Gila River Indian Community has identified adverse impacts associated with transmission line construction on the Gila River Reservation (see Alt. #3).

### 7. Route No. 7

This route would occupy the same corridor as TG&E's proposed route to the place where the latter bears west to go around the Estrella County Park. Route 7 follows the same path as Route 6, except that it continues south over the east side of the Estrella Mountains and then veers to the west to cross the Estrellas. It then turns to the southeast on the same alignment as Alternative 5 on the west side of the Estrellas, till both reach the Haley Hills. This route then continues south on the Maricopa-Pinal County line to a point just southwest of the Table Top Mountains. At this point, Route 7 takes a southeasterly direction to enter the Papago Indian Reservation, passing east of the Vekol Mountains and over the northern tip of the Santa Rosa Mountains, after which it joins the path described for Route No. 6.

The impacts of this route are different from Route 6 only in the respect that the agricultural lands west of the Maricopa

Indian Reservation are not crossed, and that the dove habitat found east of the Estrellas would not be disturbed. Impact on the Gila River Indian Community would not be as great, but the corridor located on the east side and crossing the Estrellas could not be easily ignored. A great deal of road building and site preparation for tower erection would be necessary that could be seen for long distances.

The Indian communities have objected to this route, as well as the County. The County feels that this route would have a strong adverse effect on the Estrella County Park where the corridor would parallel the Park's eastern edge.

### 8. Route No. 8

This potential corridor is much the same as Alternate No. 5 from the El Sol Substation to the place where their proposed route enters the Haley Hills. At that point, Route 8 goes directly south on the Maricopa-Pinal County line to the intersection with the Pima County line. Then a more southeasterly direction is taken between the Castle and the Cimar Mountains to the next more easterly turn at Anegam Wash. From there this route passes through the Vaca Hills and joins Alternate Routes 6 and 7 in their journey to the Vail Substation.

The impacts of Route No. 8 where it parallels the other routes have been discussed under the other alternatives. This route between the Haley Hills and its intersection with other routes near

Aguirre Wash, would intrude upon a great deal of primitive land in the Papago Reservation. There would be a moderate impact on the "human environment" of the Reservation dwellers.

### 9. Route No. 9

This alternative is more of a modification of Route No. 8. It parallels Route 8 from the El Sol Substation to the easterly turn at Anegam Wash where Route 9 takes a more southerly bearing, passing just north of the North Comobabi Mountains. At the point where it intersects with State Highway 86, it turns to the east to connect with the other routes east of the San Xavier Indian Reservation.

The impacts that would be experienced if this alternative were chosen would be essentially the same as those discussed for Route No. 8.

### 10. Route No. 10 - Proposed Corridor

This information is presented in Section II of this environmental statement.

## B. Other Alternatives

### 1. No Transmission System

The impact of not constructing a transmission system from Westwing to Vail falls into two general categories: on-site impacts and off-site impacts.

On-site impacts (those impacts associated with construction and maintenance of a powerline system) would be foregone, since no construction would occur.

If no transmission system is constructed, two additional off-site alternatives become evident. The Tucson area is confronted with a decision between (1) no growth, or (2) a continued growth condition.

If a no-growth alternative were implemented, maintaining the present level of electrical use in the Tucson area would require curtailing residential, commercial, and industrial growth and the implementation of a policy of electrical energy conservation. If such a policy were implemented, it seems unlikely that any slackening of demand could take place in the next 3 to 5 years. The complex environmental changes which would result from this reduction in electrical energy use would depend upon the application of curtailment by class of customer. Without a new power capacity during the implementation of a no-growth policy, frequent "brown-outs" and "black-outs" can be expected to occur in the near future.

If the Tucson area is to continue to grow, it must have an increased electrical energy supply. If a transmission system from the Navajo Generating Station via Westwing to Vail is not constructed, power must be supplied by some other means. The alternative of other power sources is analyzed under Alternative 5 - Other Power Sources. Quantifying the impacts of other power sources is impossible without specific proposals as to type, size, and location.

## 2. Use or Upgrade Existing Transmission Lines

TG&E does not have any transmission systems which extend north of the Saguaro Power Plant located about 30 miles north of Tucson.

There are two existing 115 kv transmission lines between Phoenix and Tucson that belong to the Bureau of Reclamation. The power they carry comes from Hoover Dam and Parker Dam.

Arizona Public Service Company has a 230 kv line extending from the Santa Rosa Substation (near Phoenix) to the Saguaro Power Plant.

All of these lines are presently being used to capacity, or any unused power capacity is reserved for use by the owners.

The capacity of these lines is less than TG&E's entitlement of Navajo Generating Plant power. Therefore, even if these lines were available for use, they could not handle the power requirement for delivery of electrical energy to Tucson.

TG&E assesses the potential for upgrading existing transmission lines in the following manner:

> "Existing lines between the Phoenix and Tucson areas are of relatively low voltage with the highest voltage being the APS 230 kv line from the Santa Rosa Substation to the Saguaro Plant. . . These lines are either being used to capacity or else any excess capacity is committed to future requirements of the owners. Uprating any of these lines to 345 kv with the capacity of the proposed line plus their present capacity is tantamount to constructing a new transmission line longer than that proposed. Neither existing right-of-way, poles, conductors or insulators are suitable for uprating to the proposed line capacity. Additional right-of-way for an uprated line would be necessary to maintain safe side clearances. Towers would have to be substituted for existing poles to attain NESC required phase separation and ground clearance, and to accommodate larger conductors and longer insulators. . . ." (Ref. 4, p. 97.)

To upgrade or double-circuit the existing low voltage lines would require the removal and replacement of the existing towers, including footings. An additional right-of-way width would also be needed to support larger towers.

Soil disturbance for such upgrading would be almost identical to the impacts of new construction, although some disturbance would be confined to areas already disturbed. Existing access roads could be used.

Impacts on wildlife populations would be less than compared to building a completely new right-of-way.

In summary, the environmental impacts of upgrading existing lines are approximately the same as for constructing a new line. The differences would be (1) that some additional environmental damage could accrue in dismantling the existing system, and (2) that a system larger than the proposed system would probably be required in order to carry the combined capacity for all the lines. Construction costs to integrate both lines into a single system are considerably higher than the cost of constructing a new powerline.

### 3. Undergrounding

This method of energy transmission would still require use of one of the corridors discussed earlier in this statement. Undergrounding is being widely utilized for low voltage urban distribution systems and for short distances in critical or highly sensitive areas. Technology in this field has not yet progressed to the point where extra high voltage underground facilities can reasonably compete economically with overhead lines. In a Study for the Electric Research Council, the consultants Arthur D. Little, Inc., found that the average cost of undergrounding high voltage transmission lines is about 20 to 30 times that of surface lines (Ref.4, p.94).

### 4. Use of Double-Circuit Towers

TG&E has indicated that the proposed corridor will host parallel one-circuit transmission lines using guyed delta towers. Construction on the first line is scheduled to begin in 1975. Probably construction on the second will follow within 1 or 2 years.

The obvious appeal of double-circuit towers is the narrower right-of-way which could accommodate both lines. A 330-foot right-of-way is being sought by the applicant. Double-circuiting would require a 250-foot width to accommodate the towers and lines. Construction of both lines at the same time would also reduce the time construction roads would be kept open and the disruption of wildlife habitat during construction.

Further investigation of double-circuit construction revealed the following trade-offs in environmental impacts and powerline reliability would be required:

a. Total right-of-way width may not be as important environmentally as the area actually used. The four-legged towers required for double-circuiting would take up more space. Each leg would require more base area than the single base for a guyed tower. Two rows of guyed towers would only require half the number of bases as four-legged towers. These four-legged towers present a much greater mass visually. They are approximately 30 feet higher and 35 feet wider than the ones that TG&E proposes to use. In addition, double-circuit towers would require approximately four times the amount of steel and considerably more concrete than the guyed delta towers. It appears that the additional steel and concrete needed in construction of a double-circuit tower would require additional access roads of higher design standards during the construction phase.

b. The reliability of power delivery would suffer using double-circuit towers. Lightning tripouts on a double-circuit tower would create an increased number of power outages compared to two separated towers. The larger mass and height may also attract more lightning strikes. The proposed guyed delta towers are designed to withstand 100 m.p.h. wind loading. At the present time a double-circuit free-standing tower cannot be designed to that standard without further increasing the amount of steel.

Double-circuiting would appear to have merit in restricted rights-of-way in urban areas and on short very accessible transmission lines.

5. Other Power Sources

Additional information on alternate power sources is contained in Energy Alternatives and Their Environmental Impacts (Ref. 17). This report analyzes the current and projected production from existing and potential energy sources.

a. Hydroelectric power:

Sites suitable for hydroelectric power generation have been utilized in the past. They are now depended upon to supplement the thermoelectric units in times of peak needs. As no decision has been made to date to build the Bridge Canyon and Marble Canyon Dams, there is little likelihood that hydroelectric power will be available in Tucson in the foreseeable future.

b. Nuclear power:

TG&E, in conjunction with the Arizona Public Service Company, the Salt River Project, and others, is a participant in the Arizona Nuclear Power Project (ANPP), where planning, licensing, and construction of a nuclear facility is underway and scheduled to be operational in the early 1980's. The proposed nuclear facility will probably be located 45 miles west of Phoenix in the vicinity of Wintersburg.

Nuclear power is not available for the immediate needs of TG&E. In addition, an economically sized nuclear facility must contain units of approximately the rating of those at the Navajo Plant, and would require cooling water presently unavailable in the Tucson area.

Breeder reactors, possibly the next type of future nuclear reactors, and fusion reactors, presently in the research stage, are possible future nuclear alternatives that are not presently available to TG&E. (Ref. 4, p. 96.)

c. Gas Turbines:

"An alternative to steam-turbine power generation is gas-turbine power generation. Gas turbines operate on an open Brayton cycle (non-condensing cycle) and do not require cooling water. Today, gas turbines are limited to liquid or gaseous fuels, which are more expensive on a thermal basis than coal. In the future, coal gasification may make it practical to operate gas turbines from coal. Today, open-cycle gas turbines are less efficient than the typical power-plant steam boiler and turbines. The combination of higher fuel costs and lower efficiency makes gas turbine operating costs higher than those of steam turbines, although gas turbine capital equipment costs and delivery times are less than those for steam turbines and associated boilers. Generally, gas turbines are used for peaking and emergency power. TGE's need is for base load (continuous) power. Combined cycle units (gas turbines plus steam boilers heated by gas-turbine exhaust) have a higher overall efficiency than gas turbines alone, but require gas turbine fuel and cooling for the steam (condensing) cycle." (Ref. 4, p. 96.)

The shortage of natural gas is an important factor in the decision to use more abundant coal resources. Existing gas supplies will be used to meet the needs of existing users and it appears that high volume new users will not be accommodated.

d. Solar Energy & Geothermal Steam:

"Although power sources such as power generation by solar energy and geothermal steam may be available in the distant future, they are clearly not available in the next decade or so.

For long-range considerations, the use of solar energy may have the potential of meeting the needs of the Southwest, and studies are underway in this area. However, even in the most optimistic projections, this energy source cannot be considered a practical alternative for base loading before the turn of the century. In order to establish the feasibility of solar energy conversion to electric power, TG&E and other utilities in the area are funding preliminary research in this area at the University of Arizona." (Ref. 4, p. 96.)

### 6. Larger Capacity Transmission Line

An alternate to constructing a 345 kv transmission line is to construct a higher voltage line to provide for future power demands. A 500 kv line is a reasonable alternative and could carry approximately twice as much power as a 345 kv line.

A 500 kv system can be constructed using the same access road system and the same staging areas as a 345 kv system. Therefore construction impacts are similar to a 345 kv system. Aesthetically, the 500 kv guyed delta towers would average about 15 feet taller and about 9 feet wider than the average 345 kv tower. To the human eye, this difference is generally undetectable. All other impacts are essentially the same for a 500 kv line as for a 345 kv line. Therefore the total environmental impact difference between a single 345 kv line and a 500 kv line is negligible.

In terms of delivering an increased amount of power to the Tucson area in future years, one 500 kv transmission line can deliver over twice as much power as one 345 kv line. Therefore, environmentally, it is more acceptable to construct a 500 kv line which has approximately the same environmental impact of a 345 kv line and the capability of handling increased capacity in future years, rather than construct a 345 kv line now and an additional line of undetermined capacity (probably 500 kv) later. However, the costs in constructing a 500 kv line are much higher than for a 345 kv line. Since TG&E's power entitlement is now something less than the capacity of a 345 kv line, a 500 kv line constructed now would have to operate at considerably less than capacity until such time as additional power becomes available. These conditions make a 500 kv line financially unattractive at this time. However, the line can physically be constructed at 500 kv capacity and operated at 345 kv (or lower), pending development of a new power source.

The original application by TG&E was for two 345 kv lines. Subsequently (as described in "Summary of Events Modifying Original Proposal"), the second transmission line application was amended to replace the 345 kv line with a 500 kv line.

On August 5, 1974, TG&E went before the Arizona Power Plant and Transmission Line Siting Committee and obtained a Certificate of Environmental Compatibility to construct either a 345 kv or a 500 kv on their first line.

## VI - SUPPLEMENT FOR WESTWING TO EL SOL SEGMENT

On June 18, 1973, the Power Plant and Transmission Line Siting Committee of Arizona granted a Certificate of Environmental Compatibility (Case #9) for an alternate route rather than the route originally proposed. This alternate route crosses 1.9 miles of national resource land along its 12.2-mile route from Westwing Substation to El Sol Substation. The Siting Committee has approved this corridor for use by both Arizona Public Service and Tucson Gas & Electric Company.

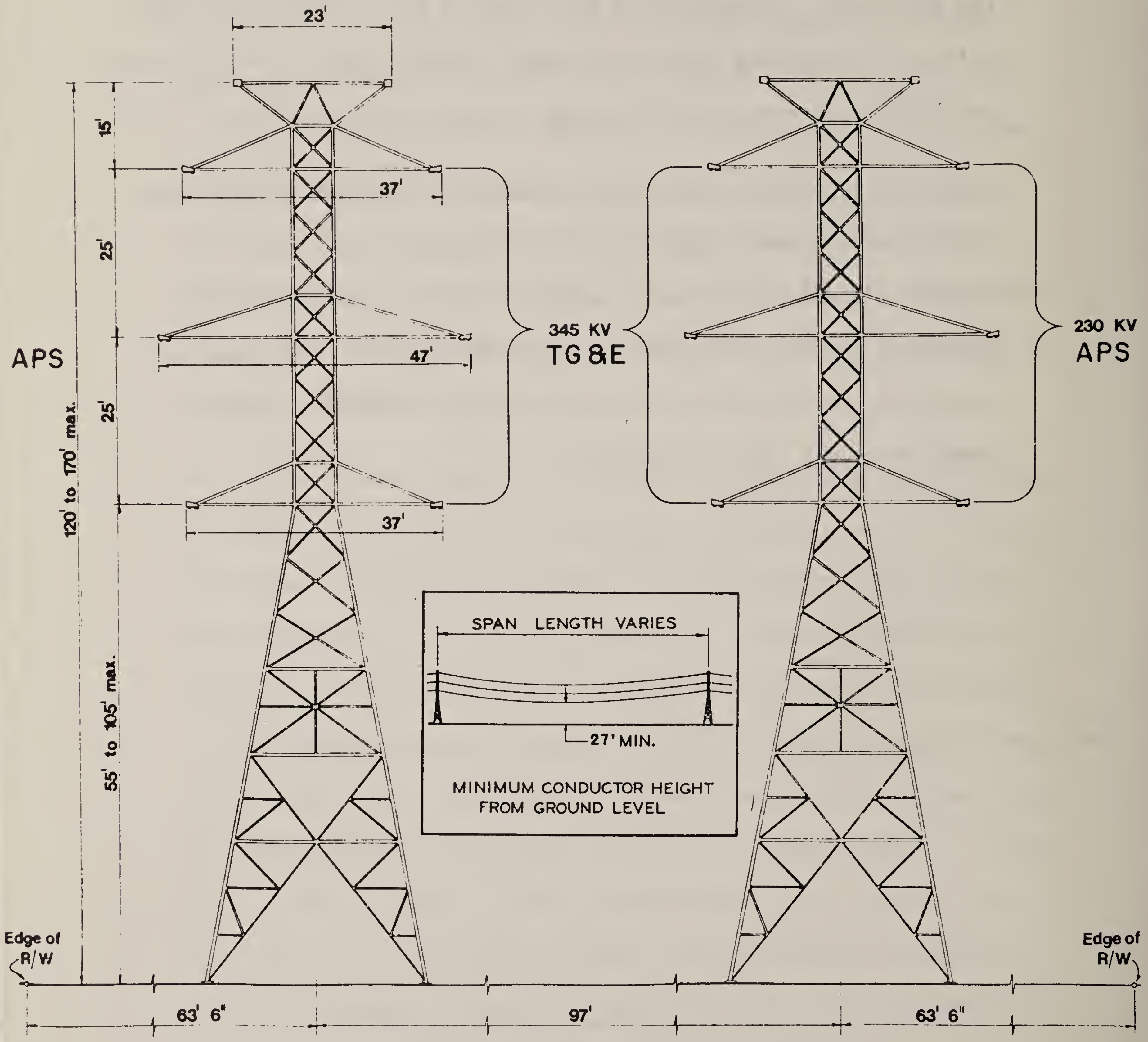
The configuration of the proposed TG&E line will depend on whether it is built at 345 or 500 kv capacity. The impact on the existing environment is discussed in detail in the Environmental Analysis Record (Appendix 12). Basically there are three existing sets of 230-345 kv double-circuit towers along the north mile and one-half of line, and two sets of existing 230-345 kv towers along the remainder of the line. One of these sets of towers belongs to APS, and they have installed only one circuit (230 kv) on these towers. If TG&E builds a 345 kv line, it will be hung on the open circuit of the APS towers, i.e., APS 230 kv on one side of tower and TG&E 345 kv on the other side of tower (see Figure 4). Thus the environmental impact of the TG&E link will simply be the addition of one set of lines on existing towers. APS indicated in their application that they intend to build a second set of towers within the same right-of-way.

If the initial TG&E line is built at 500 kv, it cannot be hung on the APS towers. However, APS will then be able to use the circuit left on the existing towers for their second circuit, and the second set of proposed towers will become a single circuit 500 kv.

Impacts of this alternative are essentially the same as discussed in the Environmental Analysis Record (Appendix 12). The only exception might be the tower design. TG&E has proposed to use guy-delta towers on the route from El Sol to Vail. If these are used along the Westwing to El Sol portion, they will be atypical compared to the existing towers.

FIGURE No. 4

## PROPOSED
## TRANSMISSION TOWER CONFIGURATION
## WESTWING TO EL SOL



## VII - CONSULTATION AND COORDINATION WITH OTHERS

### A. COMMENTS REQUESTED

Tucson Gas & Electric Company worked very closely with the Bureau of Land Management, other Federal and State agencies, and the local Indian people, to locate a route that would provide a minimum environmental impact. The company presided over several meetings of the above groups in an attempt to coordinate activities, minimize any negative effects, and to identify any problems early in the planning process.

Prior to preparation of the Draft Environmental Statement, the Bureau of Land Management requested information concerning the proposal from various organizations and groups.

Comments on the Draft Environmental Statement DES 74-7 were requested from those listed on the following distribution list. Approximately 350 copies of the Draft were printed and distributed.

# DISTRIBUTION LIST - DRAFT ENVIRONMENTAL STATEMENT TG&E 345 kv TRANSMISSION LINE, EL SOL TO VAIL

Office of the Secretary, Department of Agriculture, Attn: Dr. T. C. Byerly, Washington, D. C.
State Conservationist, Soil Conservation Service, Arizona SO, Phoenix, Ariz
U. S. Water Conservation Laboratory, Agricultural Research Service, Phoenix, AZ
Regional Forester, Southwestern Region, Albuquerque, New Mexico
Assistant Administrator Electric, Rural Electrification Administration, Washington, D. C.
Commanding Officer, Luke Air Force Base, Arizona
Commanding Officer, Davis-Monthan Air Force Base, Arizona
Commanding Officer, Williams Air Force Base, Arizona
Executive Director of Civil Works, Chief of Engineers, Department of the Army, Washington, D. C. , Attn: DAEN-CWZ-C
Division Engineer, South Pacific Division, Corps of Engineers, Department of the Army, San Francisco, California
District Engineer, Los Angeles District, Corps of Engineers, Los Angeles, Calif.
Corps of Engineers, Phoenix, Arizona
Department of Commerce, Washington, D. C., Attn: Dr. S. R. Galler, Deputy Asst. Sec. for Environmental Affairs
Regional Administrator, Region IX, Environmental Protection Agency, San Francisco, California
Department of Health, Education & Welfare, Washington, D. C., Attn: Roger O. Igeberg, Asst. Sect'y for Health & Science Affairs
Regional Administrator, IX, Department of Housing & Urban Development, San Francisco, California, Attn: Environmental Clearance Officer
Office of the Assistant Secretary for Environment, Department of Transportation, Washington, D. C.
Division Engineer, Arizona Division, Federal Highway Adm., Region 9, Department of Transportation, Phoenix, Arizona
Mr. Henry H. Haws, State BLM Advisory Board Member
Mr. Ted Lee, State BLM Advisory Board Member
Mr. John J. Levy, State BLM Advisory Board Member
Mr. Howard A. Twitty, State BLM Advisory Board Member
Dr. David B. Thorud, State BLM Advisory Board Member
Mr. Tom Wardell, State BLM Advisory Board Member
Mr. Desmond Wood, State BLM Advisory Board Member
Mr. Arthur L. Arnold, Phoenix District BLM Advisory Board Member
Mr. Ben Avery, Phoenix District BLM Advisory Board Member
Mr. Jack Clem, Phoenix District BLM Advisory Board Member
Mr. J. J. Coughlin, Phoenix District BLM Advisory Board Member
Mr. Fermin Echeverria, Phoenix District BLM Advisory Board Member
Mr. E. Laurence Narramore, Phoenix District BLM Advisory Board Member
Mr. Dale Smith, Phoenix District BLM Advisory Board Member
Mr. N. Boyd Tenney, Phoenix District BLM Advisory Board Member
Staff Assistant for Environmental Review, Office of the Special Assistant to the Secretary of the Interior, San Francisco, California
Office of the Deputy Assistant for Programs, U. S. Department of the Interior, Wash, D. C.

Commissioner's Advisor on Environmental Quality, Federal Power Commission, Washington, D. C.
Geological Survey, Washington, D. C.
Geological Survey, Menlo Park, California
Office of the Executive Director, Advisory Council on Historic Preservation, Washington, D. C.
Bureau of Indian Affairs, Washington, D. C.
Bureau of Indian Affairs, Phoenix, Arizona, Attn: Mr. James Crowther
Superintendent, Papago Indian Agency
Bureau of Mines, Washington, D. C.
Bureau of Mines, Liaison Office, Phoenix, Arizona
Chief, Intermountain Field Operation Center, Bureau of Mines, Denver, Colorado
National Park Service, Washington, D. C.
Regional Director, Western Region, National Park Service, San Francisco, Calif.
National Park Service, Phoenix, Arizona
Arizona Archaeological Center, National Park Service, Tucson, Arizona
Bureau of Outdoor Recreation, Washington, D. C.
Regional Director, Pacific SW Region, Bureau of Outdoor Recreation, San Francisco, California
Bureau of Reclamation, Washington, D. C.
Regional Director, Lower Colorado Regional Office, Bureau of Reclamation, Boulder City, Nevada
Projects Manager, Arizona Projects Office, Bureau of Reclamation, Phoenix, Ariz.
Project Manager, Parker-Davis Project, Bureau of Reclamation, Phoenix, Ariz
Bureau of Sport Fisheries & Wildlife, Washington, D. C.
Regional Director, Bureau of Sport Fisheries & Wildlife, Albuquerque, New Mexico
State Supervisor, Bureau of Sport Fisheries & Wildlife, Phoenix, Arizona
River Basin Studies, Bureau of Sport Fisheries & Wildlife, Phoenix, Arizona
Chairman, Ak Chin Tribal Council, Maricopa, Arizona
Chairman, Mohave-Apache Tribal Council, Scottsdale, Arizona
Governor, Gila River Pima-Maricopa Tribal Council, Sacaton, Arizona
Chairman, Papago Tribal Council, Sells, Arizona
Papago Tribal Utility Authority, c/o Edward B. Berger, Attorney, Tucson, Arizona
Chairman, Pima-Maricopa Indian Community, Scottsdale, Arizona
San Xavier Indian Tribe, c/o Papago Indian Agency, Sells, Arizona
Hon. Paul J. Fannin, United States Senator, Phoenix, Arizona
Hon. Barry Goldwater, United States Senator, Phoenix, Arizona
Hon. John B. Conlan, Member US House of Representatives, Phoenix, Arizona
Hon. John J. Rhodes, Member US House of Representatives, Phoenix, Arizona
Hon. Sam Steiger, Member US House of Representatives, Phoenix, Arizona
Hon. Morris K. Udall, Member, US House of Representatives, Tucson, Arizona
Arizona State Clearinghouse, Phoenix, Arizona
Maricopa Association of Governments, Phoenix, Arizona
Pima Association of Governments, Tucson, Arizona
Central Arizona Council of Governments, Casa Grande, Arizona
Hon. James A. Mack, Chairman, Natural Resources & Environment Committee, Arizona State Senate, Phoenix, Arizona
Hon. Michael Goodwin, Chairman, Environmental Future Committee, Arizona House of Representatives, Phoenix, Arizona
Andrew L. Bettwy, State Land Commissioner, Phoenix, Arizona
Mr. Dennis McCarthy, State Historic Preservation Officer, Phoenix, Arizona
Mr. Dow Ben Roush, Chairman, Environmental Planning Commission, State of Arizona, Phoenix, Arizona

Arizona Bureau of Mines, University of Arizona, Tucson, Arizona
Board of Supervisors, Maricopa County, Phoenix, Arizona
Board of Supervisors, Pima County, Tucson, Arizona
Board of Supervisors, Pinal County, Florence, Arizona
Maricopa County Parks and Recreation Dept., Phoenix, Arizona
Principal Planner, Advance Planning Division, Maricopa County, Phoenix, Arizona
Phoenix City Council, Phoenix, Arizona
Glendale City Council, Glendale, Arizona
Tolleson City Council, Tolleson, Arizona
Goodyear Town Council, Goodyear, Arizona
Avondale City Council, Avondale, Arizona
Tucson City Council, Tucson, Arizona
Peoria City Council, Peoria, Arizona
Youngtown Town Council, Youngtown, Arizona
Florence Town Council, Florence, Arizona
South Tucson Town Council, South Tucson, Arizona
Chandler City Council, Chandler, Arizona
Phoenix Chamber of Commerce, Phoenix, Arizona
Litchfield Park-Goodyear-Avondale Chamber of Commerce, Avondale, Arizona
Tucson Chamber of Commerce, Tucson, Arizona
Sun City Home Owners Association, Sun City, Arizona
Arizona Daily Star, Tucson, Arizona
Arizona Republic, Phoenix, Arizona
Department of Library & Archives, State of Arizona, Phoenix, Arizona
Phoenix City Library Reference Division, Phoenix Arizona
Tucson City Library, Reference Division, Tucson, Arizona
Glendale City Library, Reference Division, Glendale, Arizona
Mr. Larry Kusche, University Library, Arizona State University, Tempe, Arizona
Dr. A. Richard Kassander, Vice President for Research, The University of Arizona, Tucson, Arizona
Dr. E. Linwood Smith, Arizona Academy of Science, Department of Zoology, Arizona State University, Tempe, Arizona
Northern Arizona University, Flagstaff, Arizona
University of Southern California Law Center Library, Los Angeles, California
Arizona Sonora Desert Museum, Tucson, Arizona
Desert Botanical Garden, Phoenix, Arizona
Museum of Northern Arizona, Flagstaff, Arizona
Tucson Gas & Electric Company, Tucson, Arizona
Arizona Public Service Company, Phoenix Arizona
Salt River Project, Phoenix, Arizona
Central Arizona Project Association, Phoenix, Arizona
Southern Pacific Company, San Francisco, Calif.
Santa Fe Railroad Company, Office of Land Commissioner, Los Angeles, Calif.
American Tel. & Tel. Co., Tempe, Arizona, Mr. J. E. Donnelly, R/W Agent
Mountain Bell, Phoenix Arizona, Attn: Mr. Ted Vaughan
Arizona Sand & Rock Co., Phoenix, Arizona
American Sand & Rock Co., Avondale, Arizona
Hecla Mining Co., Casa Grande, Arizona, Mr. Tom Phillips, Project Engineer
Consolidated Concrete & Supply Ltd., Phoenix, Arizona
Kennecott Copper Corporation, Ray Mines Division, Hayden, Arizona
Royal A & A Materials, Glendale, Arizona
United Metro Materials & Concrete Co., Phoenix, Arizona
American Smelting & Refining Co., Exploration Department, Tucson, Arizona

Advisory Commission on Arizona Environment, Phoenix, Ariz
American Association of University Women, Tucson, Arizona
American Institute of Planners, Central Arizona Section, Phoenix, Arizona
Arizona Archeological Society, Inc., Phoenix, Arizona
Arizona Association of Landscape Architects, Phoenix, Arizona
Arizona Cattle Growers Association, Phoenix, Arizona
Arizona Conservation Council, Phoenix, Arizona
Arizona Consulting Engineers Assoc, Phoenix, Arizona
Arizona Council of Engineering & Scientific Associations, Tucson Regional Committee, Tucson, Arizona
Arizona Desert Bighorn Sheep Society, Inc., Phoenix, Arizona
Arizona Ecology Club, Tucson, Arizona
Arizona Environmental Education Council, Inc., Phoenix, Arizona
Arizona Federation of Garden Clubs, Inc., Tucson, Arizona
Arizona Mining Association, Phoenix, Arizona
Arizona Parks & Recreation Association, Phoenix, Arizona
Arizona Roadside Council, Sun City, Arizona
Arizona Society of Professional Engineers, Phoenix, Arizona
Arizona State University Students Ecology Association, Tempe, Arizona
Arizona Wildlife Federation, Phoenix, Arizona
Arizona Zoological Society, Phoenix, Arizona
Arizonans in Defense of the Environment, Inc., Tempe, Arizona
AWW, Inc., Tucson, Arizona
Coalition of Arizona Students for the Environment, Tucson, Arizona
Common Cause, Tucson, Arizona
Environmental Conscience, Inc., Phoenix, Arizona
Environmental Council of Arizona, Tucson, Arizona
Defenders of Wildlife, Tucson, Arizona
Good Earth, Tucson, Arizona
League of Arizona Cities & Towns, Phoenix, Ariz
Informed Citizens Union Committee, Globe, Arizona
Mearns Wildlife Society, Tucson, Arizona
National Wildlife Federation, Phoenix, Arizona
National Wildlife Federation, Boulder, Colorado, Mr. Edwin J. Merrick, Southwestern Regional Executive
Natural Resources Defense Council, Inc., Palo Alto, California, Mr. John E. Bryson
Nature Conservancy, Tucson, Arizona
National Speleological Society, Tucson, Arizona
Save the Old Pueblo, Tucson, Arizona
Mr. William Schuh, Regional Director, National Campers & Hikers Association, Phoenix, Arizona
Mrs. Alice Schultz, Delegate, Audubon Society, Phoenix, Arizona
Sierra Club Wilderness Office, San Francisco, California
Sierra Club, Southwest Office, Tucson, Arizona
Sierra Club, Grand Canyon Chapter, Tucson, Arizona
Southern Arizona Environmental Council, Tucson, Arizona
Southern Arizona Hiking Club, Tucson, Arizona
Tanque Verde Valley Association, Tucson, Arizona
Tucson Wildlife Unlimited, Tucson, Arizona
Technical Environmental Association for Modern Systems, Tucson, Arizona
Tucson Audubon Society, Tucson, Arizona
Tucson Cactus & Botanical Society, Inc., Oracle, Arizona

Tucson Environmental Committee, Tucson, Arizona
Tucson Mountains Association, Inc., Tucson, Arizona
Tucson Natural History Club, Sonoita, Arizona
University of Arizona Student Chapter of the Wildlife Society, Phoenix, Arizona
Valley Forward Association, Phoenix, Arizona
Western Rockhound Association, Inc., Apache Junction, Arizona
The Wilderness Society, Washington, D. C.
The Wilderness Society, Western Regional Office, Denver, Colorado
Arizona Friends of the Earth, Scottsdale, Arizona
Saguaro Ecology Club, Scottsdale, Arizona
Mr. Bill Fish, Jr., State Land Department, Phoenix, Arizona (Phone request)
John Cuneo, Bechtel Power Co., Environmental Section, Gaithersburg, Maryland (Phone request)
Woodward-Endicon, Inc., Scottsdale, Arizona (Phone request)
Dr. H. Paul Friesema, Assoc. Professor, Northwestern University Center of Urban Affairs, Evanston, Illinois (Letter request)
Dr. Paul B. Kannowski, Director, Institute for Ecological Studies, University of North Dakota, Grand Forks, North Dakota (Letter request)
Mr. Thomas Horobik, Great Falls, Montana (Letter request)
Mr. Kenneth R. Porter, Senior Biologist, Dames & Moore, Denver, Colorado (Phone request)
Public Service Company of New Mexico, Albuquerque, New Mexico (Letter request)
Mr. George Samels, Division of Conservation & Wildlife, Office of the Solicitor, U. S. Department of the Interior, Washington, D. C. (Phone request)

Additional Distribution, DES 74-7, in response to requests received after March 1, 1974.

A. H. Carpenter, 208 Cabaret Drive, El Paso, Texas 79912
Dr. M. D. Jha, Ecologist, 407 S. 30th, Lincoln, Nebraska 68510
Denree Smith, President, Good Earth, Amphitheater High School, Tucson, AZ
Don R. Millert, Limnetics, Inc., 6132 W. Fond du Lac Ave, Milwaukee, Wisc 53218
Phyllis Reed, Ecology Consultants, Inc., P. O. Box 1057, Fort Collins, Colo 80521
Wirth Associates, 2701 E. Thomas, Phoenix, AZ 85016
U. S. Geological Survey Library, National Center, Reston, Virginia
Marty Worbs, Member Arizona Power Plant and Transmission Line Siting Committee representing Arizona Water Commission.

## B. COMMENTS RECEIVED

Comments were received from those listed on the "Log of Official Comments on Draft of Bureau Environmental Statement."

Copy of each letter received is followed by a discussion of the item or issues raised by the group or individual submitting comments on the draft statement.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

## LOG OF OFFICIAL COMMENTS ON DRAFT OF BUREAU ENVIRONMENTAL STATEMENT

INSTRUCTIONS

Responsible official logs *all* comments received in *duplicate*. Files a copy with each of two (2) complete statement records under 1792. (See BLM Manual 1792.24D.)

Subject Tucson Gas and Electric El Sol to Vail, Arizona - 345 kv Transmission Lines

Location Phoenix to Tucson, Arizona

Responsible SD, SCD, Division Chief, or Task Force Chairman

State Director, Arizona

Lead WO

Division of Lands, Coordinating WO

| NO. | DATE RECEIVED | AGENCY, ORGANIZATION, OR INDIVIDUAL |
|---|---|---|
| 1 | 2/25/74 | Bureau of Mines, Intermountain Field Op. Center, Denver, Colo |
| 2 | 3/1/74 | Bureau of Outdoor Recreation, Pacific Southwest Region |
| 3 | 3/11/74 | Soil Conservation Service, USDA |
| 4 | 3/11/74 | Arizona Bureau of Mines, Univ of Arizona |
| 5 | 3/15/74 | Tucson Cactus & Botanical Society |
| 6 | 3/18/74 | Federal Highway Adm. Region 9, DOT |
| 7 | 3/18/74 | Environmental Conscience Corporation |
| 8 | 3/18/74 | Cunningham, Goodson & Tiffany, Ltd. |
| 9 | 3/19/74 | Steve Bingham Chairman BLM Lands Committee, Arizona Wildlife Federation |
| 10 | 3/19/74 | R. S. Lynch for Rawlins, Ellis, Burrus & Kiewit, Attys. for J.L. King, Goodyear |
| 11 | 3/19/74 | Chester D. McNabb, Chairman, Parks & Recreation Commission, Maricopa Co. |
| 12 | ~~3/20/74~~ | ~~Denver Service Center, BLM~~ |
| 13 | 3/21/74 | Los Angeles District, Corps of Engineers, Department of the Army |
| 14 | 3/22/74 | Bureau of Sport Fisheries & Wildlife, Region 2, USDI |
| 15 | 3/22/74 | Southern Pacific Transportation Company |
| 16 | 3/26/74 | Geological Survey |
| 17 | 3/28/74 | Bureau of Indian Affairs |
| 18 | 3/28/74 | Arizona Highway Department |
| 19 | 3/29/74 | Environmental Protection Agency, Region IX |
| 20 | 3/29/74 | U.S. Coast Guard, Dept. of Transportation |
| 21 | 3/29/74 | Rural Electrification Administration, U.S.D.A. |

Form 1792–3 (January 1972)

| NO. | DATE RECEIVED | AGENCY, ORGANIZATION, OR INDIVIDUAL |
|---|---|---|
| 22 | 4/1/74 | National Park Service |
| 23 | 4/4/74 | Department of Health, Education & Welfare, SF Regional Office |
| 24 | 4/9/74 | Arizona State Clearinghouse, Office of Econ Planning & Dev. |
| 25 | 4/10/74 | Commissioner, Bureau of Reclamation |
| 26 | 4/19/74 | Federal Power Commission, Wash DC. |
| 27 | 4/26/74 | Department of Housing and Urban Development |
| 28 | 5/10/74 | Advisory Council On Historic Preservation |
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United States Department of the Interior
BUREAU OF MINES
BUILDING 20, DENVER FEDERAL CENTER
DENVER, COLORADO 80225
Intermountain Field Operation Center

Office of
Chief

ARIZONA STATE OFFICE
BU. LAND MANAGEMENT
FEB 25 '74
SD
ASSOC. SD
FCS
RESOURCES
TECH SER
MGM'T SER
PUB. AFF
CF
ACTION
INFO.
SEE ME

February 22, 1974

Memorandum

To: State Director, Bureau of Land Management, Room 3022, Federal Building, Phoenix, Arizona 85025

From: Chief, Intermountain Field Operation Center

Subject: Draft Environmental Statement - Tucson Gas and Electric, El Sol to Vail, Arizona, 345-kV Transmission Lines

Personnel of the Intermountain Field Operation Center have reviewed the "Draft Environmental Statement, Tucson Gas and Electric, El Sol to Vail, Arizona, 345-kV Transmission Lines," for involvement with mineral resources and industry as requested recently by the Arizona State Office, Bureau of Land Management. The statement pertains to a proposed 330-ft-wide corridor between Phoenix and Tucson, Ariz., for construction of two 345-kV electric transmission lines.

An examination of library and file data revealed that during 1971 mineral deposits in Pima County, Ariz., yielded copper, molybdenum, cement, silver, sand and gravel, gold, lime, stone, lead, clays, zinc, and mica valued at about $378.2 million. During the same period, deposits in Pinal County yielded copper, molybdenum, silver, gold, sand and gravel, gypsum, lime, stone, perlite, diatomite, pyrites, and lead valued at about $211.8 million, and deposits in Maricopa County yielded sand and gravel, lime, stone, clays, mica, copper, silver, and gold valued at about $14.4 million.

At various places in the text (pp. 16, 25, 30, 96, 118), the environmental statement recognizes the existence of mines in the area, but it makes no mention of the effect of the corridor and transmission lines on mining activity. One of the reasons for rejecting alternative route No. 5 (p. 118), however, was conflict with mining claimants. It remains unclear whether construction of the proposed transmission lines would preclude mining in or under the corridor.

The report also recognizes the existence of sand and gravel resources and operations in the area (pp. 14, 30, 75) and states that existing operations will not be affected (p. 30). Further, the statement mentions (p. 14) a need for fill material and concrete aggregate that may be excavated along the proposed route. Removal of the small quantities of fill and aggregate needed for construction of this type would not significantly alter the resources of the area.

We agree with the statement on p. 128 that "The shortage of natural gas is an important factor in the decision to use more abundant coal resources. Existing gas supplies will be used to meet the needs of existing users and it appears that high volume new users will not be accommodated." Although this statement may have been written prior to the current energy shortage, it is even more pertinent in light of the existing situation.

The statement does not recognize the existence of several oil and gas pipelines that may be affected by proposed construction activities. Although no serious conflict is anticipated, we suggest that the final environmental statement consider the impacts, if any, and explain plans and intentions of Tucson Gas and Electric Corp. toward protecting or relocating the pipelines or power lines. Similarly, in the event of a future mineral discovery in or adjacent to the power corridor, what would be the attitude of Tucson Gas and Electric toward its development?

The Bureau of Mines has no objection to the draft environmental statement, provided such questions are answered insofar as possible.

O. M. Bishop
O. M. Bishop

## Comments on Items or Issues Raised
by
## U.S. BUREAU OF MINES

Item: Draft did not state whether mining would be excluded in or under the powerline corridor.

Comment: Mineral location and development would not be excluded as long as such development did not interfere with operation and maintenance of the powerlines.

Item: The draft statement did not recognize the existence of several oil and gas lines that may be affected by the proposed construction.

Comment: Where existing rights-of-way have been granted by the Government, those rights-of-way would take priority over additional rights-of-way. The proposed powerline rights-of-way cannot interfere with existing rights-of-way, and issuance of a right-of-way to TG&E would be subject to these existing rights-of-way.

Adequate provision for the protection of existing oil and gas pipelines is contained in the conditions outlined in Appendix 6 (Easement for R/W for Electrical Power Transmission Line across NRL).

Item: What would be the attitude of TG&E toward development of any minerals discovered adjacent to the lines?

Comment: The R/W that would be issued to TG&E is for construction and operation of a powerline and would not give TG&E control over future mineral development on national resource lands.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF OUTDOOR RECREATION
PACIFIC SOUTHWEST REGIONAL OFFICE
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450 GOLDEN GATE AVENUE
SAN FRANCISCO, CALIFORNIA 94102

IN REPLY REFER TO

E3035

February 26, 1974

Memorandum

To: State Director, Bureau of Land Management, Phoenix, Arizona

From: [illegible] Regional Director

Subject: Review of January 28, 1974 Draft Environmental Statement for Tucson Gas and Electric, El Sol to Vail, Arizona, 345kv Transmission Lines (DES 74-7)

As you have requested, we have reviewed the subject draft environmental statement and have determined that the action will have no significant impact upon any project or objective within our specific program areas. The statement appears to have given adequate consideration to possible effects of the action on scenic and open space values.

Frank E. Sylvester

ARIZONA STATE OFFICE
BU LAND MANAGEMENT
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JOHNNY HORIZON
'76

Let's Clean Up America For Our 200th Birthday

## Comments on Items or Issues Raised
## by
## BUREAU OF OUTDOOR RECREATION

Item: The proposal will not have any significant impact on Bureau of Outdoor Recreation programs, and statement adequately considers possible effects on scenic and open space values.

Comment: None.

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
6029 Federal Building, Phoenix, Arizona 85025

March 8, 1974

Mr. Joe T. Fallini
State Director
Bureau of Land Management
Department of Interior
Room 3022 Federal Building
Phoenix, Arizona 85025

Dear Mr. Fallini:

We have reviewed the draft environmental impact statement, Tucson Gas & Electric Co - El Sol to Vail, Arizona, 345 kv Transmission Lines (INT DES 74-7), and have no significant comments.

Thank you for the opportunity to review this draft.

Sincerely,

R L Swenson For
George C. Marks
State Conservationist

ARIZONA STATE OFFICE
B. LAND MANAGEMENT
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## Comments on Items or Issues Raised
by
## SOIL CONSERVATION SERVICE, USDA

Item: None

Comment: None

THE UNIVERSITY OF ARIZONA
TUCSON, ARIZONA 85721

ARIZONA BUREAU OF MINES
TEL. (602) 884-2733

March 6, 1974

Mr. Joe T. Fallini
State Director
Bureau of Land Management
Room 3022
Federal Building
Phoenix, Arizona 85025

Dear Mr. Fallini:

The Draft Environmental Statement -- Tucson Gas and Electric El Sol to Vail, Arizona 345kv Transmission Lines, which was received in this office on February 26, 1974, was originally reviewed by the staff of the Arizona Bureau of Mines in November, 1972.

I am attaching a copy of Dr. R. T. Moore's letter to you dated November 24, 1972, which recounts the findings of the Bureau.

Sincerely yours,

W. H. Dresher
Director

WHD:djm

cc: Dr. R. T. Moore

ARIZONA STATE OFFICE
BU. LAND MANAGEMENT

MAR 11 '74

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THE UNIVERSITY OF ARIZONA
TUCSON, ARIZONA 85721

ARIZONA BUREAU OF MINES TEL. (602) 884-2733

November 24, 1972

Mr. Joe T. Fallini
United States Department
of the Interior
Bureau of Land Management
State Office
3022 Federal Building
Phoenix, Arizona 85025

Dear Mr. Fallini:

This is in response to your letter of November 9, 1972 concerning Tucson Gas and Electic Company's proposed 345kv transmission line from Phoenix to Tucson. I have checked the literature and maps of the area of the proposed route and can fine no evidence that the transmission line will compromise what might be classed as unique geologic phenomenon.

There are several areas along the proposed line, however, that are now or have recently produced mineral commodities of various types and areas of definite potential for mineral production that should be evaluated relative to the power line. These areas and their commodities are listed below. These areas are, of necessity, categorized rather broadly inasmuch as the location of the transmission line is "painted with a broad brush" on the map furnished this office.

S.36, T3N, R1W-S.1, T2N, R1W - known sand and gravel pits
S.1, T2N, R1W to S.36T1N, R2W - potential sand and gravel (aggregate) operations
S.16, T3S, R1E to S.34, T3S, R1E - potential for mica production in vicinity of line
S.26, T7S, R3E to S9, T10S, R6E - marginal potential for base and precious metal deposits
S1 & 7, T9S, RSE and S.33&34, T9S, R6E - past production of manganese
S.13, 14 and 23, 24, T12S, R7E - past fluorspar production
S.19, T14S, R9E to S.13, T15S, R9E - potential for base and precious metal deposits
S.5-6, T16S, R11E - known beryllium deposits
S.13-24, T16S, R12E - known base and precious metal occurrences and strong possibility for major deposits

The possibility that the proposed transmission line will adversely affect the future development of such deposits should be carefully field checked and the relative value of the energy transmitted by the line versus the future need for the mineral resources affected should be carefully weighed.

I trust this information will be of use to you and if we can be of further assistance, please do not hesitate to call upon us.

Sincerely,

Richard T. Moore

Richard T. Moore
Principal Geologist

RTM:fcc

cc: Dr. W. H. Dresher

## Comments on Items or Issues Raised
by
## ARIZONA BUREAU OF MINES

Item: List of areas of potential mineral development and suggest that such deposits should be carefully field checked to avoid possible future conflicts between mining and the proposed powerline.

Comment: The issuance of a right-of-way to TG&E would allow the company to construct and operate the transmission line.

Rights-of-way on national resource lands are issued subject to valid existing rights. This includes any mining activity or claims that may be in existence prior to issuing the right-of-way.

The land is not withdrawn as a result of the right-of-way. Issuance of the right-of-way does not preclude mineral development; claims located subsequent to the right-of-way are subject to the right-of-way.

Tucson Cactus & Botanical Society

ARIZONA STATE OFFICE
BU. LAND MANAGEMENT
MAR 15 '74
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6050 Camino Esquina
Tucson Arizona 85718
14 March 1974

Mr. Joe T. Falleni
Bureau of Land Management
U.S. Department of Interior
Arizona State Office
Federal Building Room 3022
Phoenix Arizona 85025

Dear Mr. Falleni:

Many thanks for sending a copy of the Environmental Statement "Tucson Gas and Electric El Sol to Vail, 345KV Transmission Lines," to our Affiliate Director Mrs Josephine Shelby.

The report has been seen by Mrs. Shelby and also by Mr. Carl Horst, Chairman of our Legal Committee. Mr. Horst has a concern about the environment and has qualifications both as an engineer and as a Naturalist. Both of these people have prepared written comments and these we have on file. Summary thoughts are listed as follows:

1. We are impressed with the care and thoroughness with which the report has been prepared--also with the apparent attempt by TGE to meet community needs with minimum disturbance to the environment.

2. A number of omissions, seemingly wrong assumptions and questionable conclusions, have been noted, but these do not appear to be of sufficient magnitude to change the conclusions in a significant way.

3. Considering this plan by itself, and after weighing needs against probable changes, it would appear that the community could afford to accept the plan as proposed.

Having stated the above, we have a concern nevertheless about this plan as a step in the regional development. We could continue to justify and approve land use proposals on the basis of carefully prepared environmental impact statements and firm commitments to avoid undue environmental disturbance, yet, in the end--or in the not too distant future--lose the battle for the environment. Each program step, irrespective of how carefully considered, represents a step in transformation from the natural life support system to urbanized industrial complexes. In time, this procedure, although in some respects intelligent in concept, could do us in as a society.

Needed along with environmental impact studies as a basis for judgement, is a regional development plan pertaining to growth—some indication of what we wish our community to be like 10, 20 and 50 years hence, and of what effects various kinds of land use developments will have.

The present statement does not relate the proposed TGE development to other regional developments, nor does it deal with the alternate consequences of having and not having the power lines. We therefore express concern about the advisability of the proposed plan irrespective of its immediate and direct environmental impact. We would like to see proposed regional development plans before giving full endorsement to the proposal.

Please bear in mind that the thoughts expressed above have come mainly from three people, inasmuch as there has not been sufficient time to consult our full membership. However, considering the purposes of our organization, as stated in our by-laws, and the program functions being performed, it is my judgement that we would find little disagreement with the ideas set forth if all members could have been consulted individually.

Sincerely yours,

Paul S Henshaw
Paul S. Henshaw
President

## Comments on Items or Issues Raised
## by
## TUCSON CACTUS AND BOTANICAL SOCIETY

| | |
|---|---|
| Item: | Express concern that regional developmental planning has not been done prior to this time. Point out that proposals such as the subject right-of-way should be considered in the context of such a plan. |
| Comment: | Map No. 4 "Proposed Transmission Lines Needed by 1990" represents an attempt at looking at regional powerlines needed with the expected growth in the Southwest. This sort of planning is, of course, a reaction to projections and not an attempt to guide and control development. Until detailed State and regional plans are developed, we will by necessity have to analyze each proposal such as this powerline corridor on an individual basis. |

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION-REGION ~~SEVEN~~ Nine

ARIZONA
CALIFORNIA
HAWAII
NEVADA

450 Golden Gate Avenue, Box 36096, San Francisco, Calif. 94102

March 15, 1974

IN REPLY REFER TO
9ED

Arizona State Director
Bureau of Land Management
Federal Building, Room 3022
Phoenix, Arizona 85025

Dear Sir:

We have reviewed the Draft Environmental Impact Statement (INT DES 74-7) for the Tucson Gas & Electric El Sol to Vail 345 kv Transmission Lines and have no comments to offer at this time.

We appreciate this opportunity to review the subject Draft EIS.

Sincerely yours,

For
F. E. Hawley
Regional Administrator

ARIZONA STATE OFFICE
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## Comments on Items or Issues Raised
## by
## U.S. DEPARTMENT OF TRANSPORTATION

Item: None

Comment: None

ARIZONA STATE OFFICE
BU LAND MANAGEMENT
MAR 18 '74
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March 14, 1974

Mr. Joseph Fallini
State Director
Bureau of Land Management
Phoenix, Arizona 85025

Dear Mr. Fallini:

Environmental Conscience Corporation of Arizona is pleased to congratulate you and your staff on the quality of the effort represented in draft environmental statement on the El Sol to Vail, Arizona 345 KV transmission lines (INT DES 74-7 ). We appreciate the concern in evidence on behalf of the Department of Interior along with Tucson Gas and Electric Company and would like to offer the following suggestions.

In view of future requirements for electrical transmission over essentially these same corridors we would observe that a substantial reduction of future impacts are possible by building considerably higher capacity lines if these corridors are to be established. The 10 year plans of this and other electrical suppliers leave little doubt about the future transmission of additional loads between these two areas and a major future impact could clearly be avioded by making the proposed lines at least of 500KV 1000 MVA capacity. We strongly urge this as a consideration to a situation that offers precious few alternates to continued degradation of the open areas of Arizona.

We would also like to suggest that subcontractors who do site preparation for towers have some sort of incentive clause in their contracts that will carry thru the environmental precautions so carefully considered up to that point. It has occured on other lines with considerable environmental studies that such contractors have caused considerable and unnecessary damage either because they were unaware or apparently unconcerned with the total effort that they were a part of.

We hope that these suggestions will be of use to you and Tucson Gas and Electric Company in the difficult task presented by the conflicts of growth and a quality environment.

Lyndon Keefer

Lyndon Keefer
President
Environmental Conscience Corporation
Box 1469
Phoenix, Arizona 85001

cc:file

## Comments on Items or Issues Raised
## by
## ENVIRONMENTAL CONSCIENCE CORPORATION

| | |
|---|---|
| Item: | Urge that lines of higher capacity be built to avoid future environmental damage by construction of additional lines. |
| Comment: | Construction of higher capacity lines is presently being considered and is contained in detail in the Alternative Section of the final statement. TG&E has modified their proposal and received a Certificate of Environmental Compatibility from the Arizona Power Plant and Transmission Line Siting Committee to construct a 345 kv or a 500 kv on their first line. They will construct the second line as a 500 kv rather than 345 kv, even though both lines would operate for a number of years at lower capacity. |
| Item: | Suggest that contractors constructing the line have an incentive clause to insure proper construction practices. |
| Comment: | TG&E will be required to furnish a bond to insure that the terms and conditions to protect the environment and the public interest are faithfully executed. This bonding requirement, coupled with the presence of a full time Government inspector, should assure that appropriate mitigating measures are accomplished. (See Appendix 10, TG&E Guidelines to Minimize Environmental Impacts.) |

JAMES P. CUNNINGHAM
JOHN F. GOODSON
MICHAEL E. TIFFANY
DOW GLENN OSTLUND
TIMOTHY H. BARNES

OF COUNSEL
JULIAN F. WELTSCH
NELSON S. NELSON
CHARLES D. NEWTON

CUNNINGHAM, GOODSON & TIFFANY, LTD.
ATTORNEYS AT LAW
NINTH FLOOR LUHRS BUILDING
CENTRAL AND JEFFERSON
PHOENIX, ARIZONA 85003

TELEPHONE
(602) 254-5104

TO P.C
Copy made for
file.
[illegible]

March 16, 1974

STATE DIRECTOR
BUREAU OF LAND MANAGEMENT
3022 Federal Building
Phoenix, Arizona 85025

COMPLAINT AGAINST PLACEMENT OF TUCSON GAS & ELECTRIC POWER LINE

Dear Sir:

We have been asked to register a formal complaint on behalf of the property owners owning property along the proposed right-of-way of the Tucson Gas & Electric Company power lines that are to run along the west side of the Estrella Mountains in west Maricopa County.

We understand that Tucson Gas & Electric Company is asking for two sets of lines which will be used immediately.

We understand further that there will be a nuclear power plant that will be constructed in the vicinity of Buckeye, Arizona, and that this plant will also need its own set of transmission power lines.

Our clients strongly recommend that the State Director establish a route for the Tucson Gas & Electric Company power lines which is coordinated into one corridor with the electric lines from the proposed Buckeye nuclear power plant.

By having all of the lines in one corridor, this will minimize the damage to the countryside and the aesthetic views of the mountains in that area.

We request that this letter be filed as a formal complaint and that a hearing be set upon this complaint so that our clients may be heard before any final decision is made.

Very truly yours,

JOHN F. GOODSON

JFG/lt

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LAND MANAGEMENT
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LAND OFFICE
PHOENIX, ARIZONA

## Comments on Items or Issues Raised
by
JOHN F. GOODSON

| | |
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| Item: | Suggests that lines that may be coming from Buckeye, Arizona, be placed in a common corridor with the lines proposed in the draft statement. |
| Comment: | If and when additional generating facilities are constructed, consideration would be given to using existing rights-of-way. The power that is presently being proposed for transmission is generated at Page, Arizona, and arrives in Phoenix on lines just constructed. See "Summary of Events Modifying Original Proposal," and Alternatives Section V, Alternative 6 - Larger Capacity Transmission Line. |
| Item: | Request that a hearing be held. |
| Comment: | A hearing was held on August 5, 1974 (Case No. 15) before the Power Plant and Transmission Line Siting Committee of Arizona, for the proposed transmission line. The application of TG&E for a Certificate of Environmental Compatibility was approved.<br>As the Bureau had only two requests for a hearing (Mr. Goodson's and one other), the decision was made that a public hearing could not be justified. See following letter dated March 21, 1974, to Mr. Goodson from State Director. |

March 3 1849

United States Department of the Interior

BUREAU OF LAND MANAGEMENT

IN REPLY REFER TO

1792 (911)

State Office
3022 Federal Building
Phoenix, Arizona 85025

March 21, 1974

Mr. John F. Goodson
Attorney at Law
Cunningham, Goodson & Tiffany, Ltd.
Ninth Floor Luhrs Building
Phoenix, Arizona 85003

Dear Mr. Goodson:

Thank you for your letter of March 16, 1974, pertaining to the Tucson Gas & Electric Company El Sol-Vail Transmission Line.

If circumstances warrant after receiving comments on the draft environmental impact statement, a public hearing will be held before the final impact statement is prepared.

Your comments will be given consideration.

Sincerely,

Joe T. Fallini

State Director

ARIZONA STATE OFFICE
BUREAU OF LAND MANAGEMENT
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Safford, Arizona
15 March 1974

State Director
Bureau of Land Management
Room 3022 Federal Building
Phoenix, Arizona 85025

Dear Sir:

I would like to offer comments and suggestions on the Draft Environmental Statement, "Tucson Gas and Electric El Sol to Vail, Arizona, 345kv Transmission Lines". As chairman of the BLM Lands Committee of the Arizona Wildlife Federation, I have been asked to consider the possible impacts on wildlife as outlined in this Statement.

The alternatives of "No Transmission Line" or "Use or Upgrade of Existing Transmission Lines" would have by far the least impact on wildlife and would be the most acceptable. However, I am a realist, and strongly support Alternative 4, "Use of Double Circuit Towers" along the proposed corridor.

Repeatedly listed in the Draft Statement as an unavoidable adverse effect on wildlife will be the harassment of wildlife and the disturbance of wildlife territorial habit and travel routes during construction. The greatest impact will be on bighorn sheep in limited areas, and on javelina over most of the route of the proposed corridor. Stress, from disturbance and harassment, has been shown to be a limiting factor for each of these species. The requirement of double circuit towers, with constuction in one phase rather than two, would cut this period of stress in half and would be a most favorable alternative.

Another serious impact on wildlife will be the construction of an access road system for construction and maintenance of the transmission line. In line with this I would suggest the additional proposed mitigatory measure (II.B.1.d.(1)(b) page 56 of the Draft Statement) "-and any roads constructed may be permanently closed after construction is complete", be changed in the Final Environmental Statement and in the construction requirements to " - and all roads constructed will be permanently closed immediately after construction is complete unless specifically exempted by the Authorized Officer".

The adverse effects of a road system in wildlands and the impact on wildlife have been well described in the Draft Statement. The requirement of a double circuit line and the completion in one construction phase would reduce the time in which these adverse effects could occur. In the two phase type of construction proposed, construction roads would undubtedly be kept open for the several to many years until construction is complete.

All mitigating measures listed in the application and all additional proposed mitigatory measures are excellent and should be included in the Final Environmental Statement and in the construction requirements.

Listed as a beneficial impact of construction (page 65) is: "Roads will create, to some degree, added edge effect, thereby improving habitat during the period of plant recovery". This is extremely doubtful in the vegetation types along the proposed route. Unless hard data is available to reinforce this statement, it should not be included in the Final Environmental Statement. Also listed as a benefit of a corridor (page 112) is: " - it will provide easier access to reach and control wild fires". I am wondering if the occurance of wild fires in the vegetation types along the proposed route is of a high enough frequency to warrant inclusion of this statement as a benefit.

I hope these comments and suggestions will be taken into consideration in the preparation of the Final Environmental Statement.

Sincerely,

Steve Bingham

Steve Bingham , Chairman
BLM Lands Committee
Arizona Wildlife Federation

## Comments on Items or Issues Raised
## by
## ARIZONA WILDLIFE FEDERATION

Item: Suggests use of double-circuit towers and one-time construction to reduce impacts on wildlife.

Comment: See Alternatives Section V - Alternate 4, Double Circuit Towers.

Item: Suggests that all construction roads be closed immediately unless specifically exempted by the authorized officer.

Comment: Stipulations contained in the Grant of Right-of-Way will incorporate this suggestion (See II B1c(3)b).

Item: Questions if construction of roads will create additional edge effect and if assurance of fires would warrant the statement that additional roads would aid in fire suppression.

Comment: The text in the final statement has been revised.

See following letter dated March 21, 1974, to Mr. Bingham.

March 3 1849

United States Department of the Interior

BUREAU OF LAND MANAGEMENT

State Office
3022 Federal Building
Phoenix, Arizona 85025

IN REPLY REFER TO

1792 (911)

March 21, 1974

Mr. Steve Bingham, Chairman
BLM Lands Committee
Arizona Wildlife Federation
2006 18th St
Safford, Arizona 85546

Dear Mr. Bingham:

We appreciate your comments and suggestions pertaining to the TG&E El Sol to Vail Transmission Line.

Very careful consideration was given wildlife requirements in studying various possible routes. We believe the proposed route will have the least impact on wildlife. No hills are crossed except at the north end and the south end on the Papago Indian Reservation. In both instances suburban developments have already encroached on these areas.

Thank you for your comments and be assured they will be given consideration before any final decision is made.

Sincerely,

Joe T. Fallini

State Director

RAWLINS, ELLIS, BURRUS & KIEWIT
ATTORNEYS AT LAW
SUITE 2300 VALLEY CENTER
PHOENIX, ARIZONA 85073
[602] 257-5700

GEORGE H RAWLINS (1901-1963)
R. J. ELLIS
WILLIAM H BURRUS
PETER KIEWIT, JR
WM M WALDROM
DENNIS M BALINT
NORMAN D. HALL, JR
WILLIAM D BAKER
LAWRENCE L. PAVILACK
CHESTER J. PETERSON
ROBERT L. GOTTSFIELD
MICHAEL S MILROY
H. J LEWKOWITZ
MICHAEL V MULCHAY
BURKE ROSENZWEIG
EDWARD O BURKE
JAMES M. MARLAR
ROBERT S LYNCH
REDFIELD T. BAUM
TIMOTHY C. WESTFALL

SCOTTSDALE OFFICE
300 CAMELVIEW PLAZA
6900 EAST CAMELBACK ROAD
SCOTTSDALE, ARIZONA 85251

WILLIAM H BURRUS
JAMES A. TILKER
MARSHALL L PETERSON

ARIZONA STATE OFFICE
BU. LAND MANAGEMENT
MAR 19 '74
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March 18, 1974

Mr. Joe T. Fallini
Arizona State Director
Bureau Of Land Management
Phoenix, Arizona 85025

Re: Draft Environmental Impact Statement, TG&E 345 k.v. Transmission Line, El Sol to Vail, Arizona (INT DES 74-7).

Dear Mr. Fallini:

I represent Mr. J. L. King of Goodyear, Arizona. Mr. King owns property on which he lives in Section 31, T.1 N., R.1 W., G.S.R.B. & M. He also has an interest in adjacent property, including property in Section 36, T.1 N., R.2 W., across which Tucson Gas & Electric Co. proposes to construct a 345 k.v. transmission line using 100' towers and a 300' right-of-way. A second set of towers and line is contemplated in the near future on the same right-of-way. The Company has applied to your agency and to BIA for right-of-way across Federal and Indian Lands and BLM has prepared a draft environmental impact statement on these applications and the proposed line.

My client was not given a copy of the DES, nor was he asked to comment thereon. Indeed, it appears from the list of persons and organizations contacted that none of the private landowners along the proposed route were brought into the process at all, either by being asked to comment or invited to a public hearing. I find it hard to believe that such a list would be so large or so hard to make up that this entire class of affected persons was systematically excluded from the NEPA process.

Moreover, even a cursory review of DES 74-7 demonstrates that the alternatives to the proposal were only cursorily examined and, in fact, were discarded by TG&E prior to the statement being written because they would cross Indian Lands and the tribes objected. No alternatives west of the present alignment as it approaches the Gila River from the south were even mentioned.

In short, the DES and the NEPA process in this instance are both defective for these and other reasons. Having had to borrow a copy of the DES last week, I have not had an opportunity to review all the material and background alluded to therein. But my review to date leads me to believe that this proposed route will be not just for one or two lines, but will become the major transmission corridor between Phoenix and Tucson, including lines from the Arizona Nuclear Power Project. One only need look at the map of existing and proposed lines to see that once a corridor is established, it is used over and over as needs arise. Given this fact, why isn't this impact focused on in the DES? Why wasn't AEC asked to comment? Why isn't the Fred J. Weiler Greenbelt even discussed? Why aren't comments received prior to printing the DES enclosed therein?

On behalf of Mr. King, and all the other private landowners left out in the dark, I object to any further federal action on these TG&E applications until the DES is rewritten to truly reflect the range of alternatives open to BLM, BIA and the Company and until private landowners directly affected by any decision on this matter are given the same consideration as environmental groups. The scope of the statement belies the long-term impact the establishment of this corridor must have on the area. The only way to effectively assess the impact of this proposed action and the only reasonable way to gain participation from the public, especially that segment most directly affected, is to announce and hold one or more public hearings.

Please keep me advised of any further developments in this matter. I would appreciate a response to the above comments at your earliest convenience.

Sincerely,

Robert S. Lynch
for
RAWLINS ELLIS BURRUS & KIEWIT

RSL:so

## Comments on Items or Issues Raised
by
## ROBERT S. LYNCH

Item: Mr. Lynch represents a private land owner whose property would be crossed by the proposed powerlines and does not feel that all alternative routes were considered. Requests a public hearing.

Comment: A hearing was held on August 5, 1974 (Case No. 15) before the Power Plant and Transmission Line Siting Committee of Arizona, for the proposed transmission line. The application for a Certificate of Environmental Compatibility was approved.

As we have had only two requests for a hearing (Mr. Lynch and one other), the decision was made that a public hearing could not be justified.

See following letter to Mr. Lynch dated March 21, 1974.

United States Department of the Interior

BUREAU OF LAND MANAGEMENT

State Office
3022 Federal Building
Phoenix, Arizona 85025

IN REPLY REFER TO
1792 (911)

March 21, 1974

Mr. Robert S. Lynch
Attorney at Law
Rawlins, Ellis, Burrus & Kiewit
Suite 2300 Valley Center
Phoenix, Arizona 85073

Dear Mr. Lynch:

The Tucson Gas & Electric Company has been actively engaged for over 3 years attempting to locate an acceptable transmission line right-of-way. During this time, ten different routes across the Gila River Indian Reservation and to the east and west were considered.

It is the responsibility of Tucson Gas & Electric Company to obtain rights-of-way from patented landowners, that is, Indians, State Land Department, and private citizens. The Bureau of Land Management, representing the only Federal land managing agency, was given the responsibility of preparing the environmental impact statement.

The Bureau of Land Management prepared the draft environmental impact statement, sending copies to all parties that had shown any interest in the proposed line. News releases were made available to the public at the time the Council on Environmental Quality authorized publication of the environmental impact statement. Since that time, BLM has given copies to all who have requested a copy. If circumstances warrant after receiving comments on the draft statement, a public hearing will be held before the final environmental statement is prepared.

Your comments will be considered.

Sincerely,

Joe T. Fallini

State Director

MARICOPA COUNTY PARKS AND RECREATION DEPARTMENT

4701 EAST WASHINGTON STREET, PHOENIX, ARIZONA 85034
ADMINISTRATION & PARKS 262-3711 RECREATION 262-3716

ARIZONA STATE O FICE
B. LAND MANAG
MAR 19 '74
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March 18, 1974

Mr. Joe T. Fallini, State Director
Bureau of Land Management
Federal Building, Room 3022
Phoenix, Arizona 85025

Dear Mr. Fallini:

Re: Your letter 1792(911) El Sol to Vail, Arizona
345 KV Transmission

Tucson Gas and Electric has shown unusual interest in the environmental aspects of transmission line construction. From our standpoint, the Delta-guyed single circuit tower is an outstanding effort at minimizing visual impact, and we endorse its use.

Regarding the proposed 345 KV line being considered, there are matters that should be explored where this line passes west of Estrella Mountain Regional Park. The Parks Commission strongly urges T. G. & E. and the Bureau of Land Management to locate this line as far to the west as possible where it parallels the west boundary of the park. There appears to be some latitude in property boundaries, especially along the more central and southern portions of the west park boundary. It is felt that the greater the setback to the west, the more the visual impact will be reduced. Further, it appears that to accomplish this would involve very little, if any, additional expense to T. G. & E. Special attention should be given to avoid skylining the towers with respect to views from park property.

The establishment of staging or materials storage areas would have a much greater visual impact with respect to the park than the lines themselves. We particularly request T. G. & E. to situate these staging areas in locations well away from any park boundary and in such areas so as not to be visable from the park property.

The plan, as it stands, would be to construct a 345 KV line now and a 500 KV line at a later date. A question exists as to the comparative impact between two Delta-guyed lines and a single free standing line. T. G. & E. has indicated

PARKS AND RECREATION COMMISSION

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DONALD R. LIEM
FRED J. NOBBE
A. T. FRED STAPLEY

THOMAS R. WARDELL • DIRECTOR

that the single free standing tower presents engineering problems that are near unsurmountable. Even with the single tower approach, the line must still carry two circuits: one 345 and one 500 KV. The question that has to be asked is, of the two options, which is the least detrimental? Throughout Arizona, transmission lines are proliferating at an alarming rate. In some instances, four lines exist in one corridor. How much better it would be to have only one or at most two lines in a given corridor. Some advance planning could have avoided some of the highly unsightly transmission lines we now have.

Another detail that has been clarified in a telephone conversation with Mr. Tom Via of T. G. & E., March 13, 1974, is the location of the White Tanks Mountain Microwave Relay Station (on the map attached to the study, the microwave relay is shown in the southeast corner of the park). We have been assured that the location is on the existing microwave relay site in the White Tanks, and no new sites or roads would be established with this particular station. T. G. & E. has also assured us that construction roads related to this particular line will be available for Hiking and Riding Trail purposes. This may be one of the most positive environmental elements in this entire project.

Basically, the Commission has no particular objection to the project within the foregoing constraints and comments. Ultimately the proposed route is very likely not the best, but in deference to the financial and social implications involved in the whole project, the Commission feels additional objections are unwarranted at this time.

Sincerely,

Chester D. McNabb

Chester D. McNabb, Chairman
Parks and Recreation Commission

M:W:w

## Comments on Items or Issues Raised
## by
## MARICOPA COUNTY PARKS AND RECREATION DEPARTMENT

| | |
|---|---|
| Item: | Express concern for the proposed location and its possible impact on the Estrella Mountain Regional Park. |
| Comment: | On-the-ground inspections have been made jointly by BLM and County Park officials to more closely analyze the visual impacts of the proposed lines. Care will be taken to minimize the visual impact from the Park. |
| Item: | Discusses the engineering problems associated with double-circuit towers and points out that better advance planning would possibly reduce the number of powerlines needed. |
| Comment: | See following letter to Mr. McNabb dated March 21, 1974, and Alternatives Section V - Alternative 4, Double Circuit Towers. |

IN REPLY REFER TO

1792 (911)

United States Department of the Interior

BUREAU OF LAND MANAGEMENT

State Office
3022 Federal Building
Phoenix, Arizona 85025

March 21, 1974

Mr. Chester D. McNabb, Chairman
Parks and Recreation Commission
Maricopa County
4701 E. Washington Street
Phoenix, Arizona 85034

Dear Mr. McNabb:

We appreciate receiving your comments on the Tucson Gas & Electric Company El Sol to Vail Powerline. We will give full consideration to your proposals to minimize the visual impact on Estrella Mountain Regional Park.

TG&E is cooperating in reducing the number of lines wherever possible. As you know, instead of two 345 kv lines, they are now proposing one of these lines to be 500 kv, even though they operate the second line at 345 kv over the next five to six years.

Thank you again for your timely comments which will be considered in the preparation of the final impact statement.

Sincerely,

Joe T. Fallini

State Director

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
P. O. BOX 2711
LOS ANGELES, CALIFORNIA 90053

ARIZONA STATE OFFICE
B. LAND MANAGEMENT
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SPLED-E

15 March 1974

Mr. Harold H. Ramsbacher,
Acting State Director
United States Department of the Interior
3022 Federal Building
Phoenix, Arizona 85025

Dear Mr. Ramsbacher:

This is in response to your recent notice in which you requested review and comments on the draft environmental impact statement for Tucson Gas and Electric El Sol To Vail, Arizona 345kv Transmission Lines.

The proposed plan does not conflict with existing or authorized plans of the Corps of Engineers. We have no comments concerning the environmental statement for this proposed action.

Thank you for the opportunity to review and comment on this draft statement.

Sincerely yours,

Garth A. Fuquay
GARTH A. FUQUAY
Chief, Engineering Division

## Comments on Items or Issues Raised
by
## CORPS OF ENGINEERS

Item: Proposal does not conflict with any plans of the Corps and they have no comments.

Comment: None

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE
POST OFFICE BOX 1306
ALBUQUERQUE, NEW MEXICO 87103

IN REPLY REFER TO:

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March 19, 1974

MEMORANDUM

TO: State Director, Bureau of Land Management, 3022 Federal Building, Phoenix, Arizona 85025

FROM: Regional Director, Region 2

SUBJECT: Review of Draft EIS, Tucson Gas & Electric - El Sol to Vail, Arizona 345 KV Transmission Lines, (Int. DES 74-7)

We have reviewed the subject draft as requested and offer the following comments:

Criteria for constructing "bladed" roads is ambiguous and needs further clarification.

Which access roads are to be obliterated after the construction phase is completed and which roads will remain for the use of ground maintenance crews needs to be spelled out.

The partial Vertebrate List - Appendix 5 has no bats listed. This power line area is within the range of numerous bat species, including the threatened Spotted Bat.

The bird list of the area includes several threatened species.

The proposed route of this transmission line will disturb a significant amount of Saguaro - Palo Verde and riparian habitat of a relatively undisturbed nature with subsequent disturbance of wildlife. This line will also provide more access with subsequent impacts into desert sheep habitat in the northern portion of the Papago Indian Reservation. A more favorable route from the environmental and wildlife aspect would be to route this

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line east at Enid parallel to the Southern Pacific Railroad right-of-way and follow this right-of-way on to the Vail Substation south of Tucson. Another favorable route would be for the proposed route at its intersection with highway 8 to turn east and run parallel to the highway to the intersection of highway 10 and 8 then parallel highway 10 to the west edge of Tucson where it would skirt the south edge of Tucson to Vail Substation.

## Comments on Items or Issues Raised by BUREAU OF SPORT FISHERIES AND WILDLIFE

Item: Criteria for constructing a "bladed" road should be clarified.

Comment: Blading of roads will only be done where necessary to move heavy equipment to the tower sites. It is anticipated that the majority of the sites can be reached by driving cross-country on designated routes without having to actually move any soil or clear any vegetation.

The design criteria and rehabilitation requirements are outlined in Appendix 6.

Item: Which access roads are to be obliterated after construction and which roads will remain for maintenance?

Comment: After a right-of-way is granted, the applicant is required to complete a detailed plan which includes tentative routes of temporary and permanent access roads. All road construction will be held to a minimum and only those roads absolutely necessary will remain for maintenance.

Item: Appendix 5 did not list any bats. The range of the threatened spotted bat would be crossed by the proposed powerline.

Comment: The possibility of the spotted bat's occurrence has been added in Appendix 5.

Item: The bird list includes several threatened species.

Comment: Of the species formally classified as endangered under the 1973 Endangered Species Act, only the American Peregrine Falcon may be found along the proposed route. The powerline configuration virtually eliminates the possibility of electrocution of birds.

Comments, BSF&W (continued)

Item: Proposed route would disturb a significant amount of Saguaro-Palo Verde and riparian habitat of a relatively undisturbed nature with subsequent disturbance of wildlife. Line would impact bighorn sheep habitat on the northern portion of the Papago Indian Reservation.

Comment: The statement reflects these possible impacts.

Item: Suggests two more favorable routes from a wildlife standpoint.

Comment: Ten routes and variations were considered, including the suggested routes. For further discussion, see Alternative Routes (Section V-A).

**Southern Pacific**
**Transportation Company**

400 EAST TOOLE AVENUE, TUCSON, ARIZONA 85701

IN REPLY PLEASE REFER T

R. O. COLTRIN
SUPERINTENDENT

March 20, 1974

312-1

ARIZONA STATE OFFICE
BU. LAND MANAGEMENT
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State Director
Bureau of Land Management
Room 3022 Federal Building
Phoenix, Arizona 85025

Attention: Mr. H. H. Ramsbacher,
Acting State Director

Re: 1972 (911)

Dear Sir:

This will acknowledge receipt of your transmittal of draft of environmental impact statement, Tucson Gas and Electric Company - ElSol to Vail, Arizona, 345 KV Transmission Line (INT. DES. 74-7).

We note that proposal would involve crossing our right-of-way at several points, and we wish to advise that Railroad should be considered before any proposal is progressed.

Very truly yours,

R. O. Coltrin,
Superintendent

## Comments on Items or Issues Raised
by
## SOUTHERN PACIFIC TRANSPORTATION COMPANY

Item: Advise that Railroad should be considered before any proposal is processed.

Comment: Issuance of a right-of-way to TG&E would be subject to existing rights. Railroad right-of-way presently in existence would fall within this category.

March 3, 1849

United States Department of the Interior

GEOLOGICAL SURVEY
RESTON, VIRGINIA 22092

OFFICE OF THE DIRECTOR

ARIZONA STATE OFFICE
BU. LAND MANAGEMENT

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March 21, 1974

DES 74-7

Memorandum

To: State Director, Bureau of Land Management, Phoenix, Arizona

Acting

Through: Deputy Assistant Secretary--Energy and Minerals

Welo
MAR 25 1974

From: Director, Geological Survey

Subject: Review of draft environmental statement for 345 kV transmission line, El Sol to Vail, Arizona

We have reviewed the subject draft environmental statement as you have requested.

The danger of accelerated erosion resulting from construction activities including development of access roads in the desert terrain is recognized in the draft statement and careful safeguards and mitigative measures are described. The only significant adverse impact, related to geologic conditions, expected to result directly from the proposed project is the visual intrusion of the power line in a scenic landscape. A potential secondary effect, noted in the environmental statement (p. 109), is increased use of the area by off-road vehicles with resultant disruption of the surface and subsequent erosion.

We anticipate that the project will have no effect on water resources in the area.

Henry W. Coulter

Acting Director

## Comments on Items or Issues Raised
by
## U.S. GEOLOGICAL SURVEY

Item: Express agreement with draft statement and state that Geological Survey does not anticipate any impact on water resources in the area.

Comment: None.

United States Department of the Interior

BUREAU OF INDIAN AFFAIRS
WASHINGTON, D.C. 20242

IN REPLY REFER TO:
Trust Facilitation

ARIZONA STATE OFFICE
BU. LAND MANAGEMENT

MAR 28 '74

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Memorandum

To: State Director, Bureau of Land Management
Phoenix, Arizona

From: Acting Director, Office of Trust Responsibilities

Subject: Review of Draft Environmental Statement for Tucson Gas and Electric El Sol to Vail, 345 KV Transmission Line, Arizona (DES 74/7)

This office has completed its review of the subject Environmental Statement. Substantial input in the preparation of the draft was furnished by the Papago Tribe. Mitigating measures have been established in the proposal and the regulatory documents, and these arrangements are acceptable to the Papago Tribe.

Kenneth L. Payton

## Comments on Items or Issues Raised
by
BUREAU OF INDIAN AFFAIRS

Item: States that mitigating measures included in the proposal are acceptable to the Papago Tribe.

Comment: BIA and the Papago Tribal Utilities Authority have had considerable input in the preparation of the draft environmental impact statement.

JACK WILLIAMS
GOVERNOR

WALTER W SURRETT
CHAIRMAN

WALTER A NELSON
VICE CHAIRMAN

LEN W. MATTICE
MEMBER

BILL ERDMANN
MEMBER

RANCIS N. CONNOLLY
MEMBER

1912

W. A. ORDWAY
ACTING STATE HIGHWAY DIRECTO

WM. N. PRICE
STATE HIGHWAY ENGINEER

ARIZONA HIGHWAY DEPARTMENT
Environmental Planning Division
1739 West Jackson Street
Mobile Unit #10
Phoenix, Arizona 85007

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March 27, 1974

Mr. Joe T. Fallini
Arizona State Director
Bureau of Land Management
Room 3022 Federal Building
Phoenix, Arizona 85025

Re: Draft Environmental Impact
Statement for the Proposed
El Sol to Vail 345 KV
Transmission Lines

Dear Mr. Fallini:

The Draft Environmental Impact Statement, Tucson Gas and Electric Company, El Sol to Vail, Arizona, INT DES 74-7, has been referred to this Division for review and comment.

Of particular interest to the Arizona Highway Department will be the impacts created by the location and construction features of the proposed project wherever transmission lines cross Interstate or State highways.

Normally an application for grants of right of way or construction easements across State roadways is processed initially through the local District Engineer's office, then forwarded to the Permits Branch for review and finally to the Utilities and Railroad Engineering Division for final approval. Whenever interstate highways are involved, additional review and approval must be obtained from the Federal Highway Administration.

Otherwise the draft statement appears to be in conformance with the provisions of Section 102(2)(C) of the National Environmental

Policy Act of 1969. Based primarily on a desk review of the statement, we foresee no significant adverse environmental effects upon Interstate or State highways.

We appreciate the opportunity to review this draft statement.

Yours very truly,

WM. N. PRICE
State Highway Engineer

Mason J. Toles

MASON J. TOLES
Division Manager

MJT/WJH/cm

## Comments on Items or Issues Raised
by
## ARIZONA HIGHWAY DEPARTMENT

Item: Additional review and approval must be obtained from the Federal Highway Administration.

Comment: Where the lines will cross highways, additional height will be added to maintain minimum clearances as specified in the National Electric Safety Code.

See letter from Federal Highway Administration dated March 15, 1974, in this section.

Item: Based on a desk review, no significant impacts on highways are anticipated.

Comment: None

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
100 CALIFORNIA STREET
SAN FRANCISCO, CALIFORNIA 94111

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BU. LAND MANAGEMENT
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MAR 27 1974

Mr. Joe T. Fellini
Arizona State Director
Bureau of Land Management
Federal Building, Rm. 3022
Phoenix AZ 85025

Dear Mr. Fellini:

The Environmental Protection Agency is replying to your request for our comments on the draft impact statement for the Tucson Gas and Electric Company - El Sol to Vail, Arizona, 345 kv Transmission Lines.

We believe that the soil disturbance caused during construction may lead to chronic dust problems. Because this area is already in violation of national standards for particulate matter, it is important that stringent dust control measures be implemented, both during and after construction. There should be explicit dust control requirements placed on the Grantee, and these should be clearly reflected in the impact statement. Specific comments are enclosed.

EPA's comments on this draft statement have been classified as Category ER-2. Definitions of the categories are provided on a separate enclosure. Our procedure is to classify our comments in terms of both the environmental consequences of the proposed action and the adequacy of the draft statement itself. The classification and date of EPA's comments will be published in the Federal Register in accordance with our responsibility under Section 309 of the Clean Air Act to inform the public of our views on proposed Federal actions.

We will appreciate receiving a copy of the final statement when it is available.

Sincerely,

Paul DeFalco, Jr.
Regional Administrator

Enclosures

cc: Council on Environmental Quality, Wash., D.C. 20460
Attn: Editor, 102 Monitor

Review and comment on the draft environmental impact statement prepared by the Bureau of Land Management for the Tucson Gas and Electric Company - El Sol to Vail, Arizona, 345 kv Transmission Lines.

EPA is concerned primarily with the potential dust problem associated with the transmission lines, particularly since the Phoenix-Tucson Air Quality Control Region experiences chronic violation of National Ambient Air Quality Standards for particulate matter. The EIS properly acknowledges that construction of the transmission lines (tower sites, staging areas, roads, borrow sites) will cause disruption of the natural surface soil crust and expose the unconsolidated soils to wind erosion.

The impact statement also indicates that the Grantee will be required to implement measures to adequately control dust during the construction phase. However, it is not clear from the statement that permanent control measures will be required to minimize dust during the post-construction years. The impact statement does not describe thoroughly the vegetative rehabilitation program, nor does it specify the conditions under which it will be implemented. It is implied that only initial re-seeding is required and that the Grantee has no responsibility to ensure that the re-seeding program leads to successful revegetation. Similarly, the bonding requirements placed on the Grantee do not explicitly describe the responsibility to restore the land to its original condition.

The EIS acknowledges that a large network of roads will remain after the construction phase, and that unauthorized use of such roads could lead to significant dust problems. The EIS should clearly describe the extent of this residual road network, the portions open to public access, and the criteria for allowing public access. The EIS should also elaborate on the specific measures to be taken in each case to prevent excessive airborne dust.

EPA believes that the Grantee should be required to undertake a positive program of revegetation which includes not only re-seeding but maintenance as well. Similarly, the bonding requirements should explicitly require the Grantee to take the steps necessary to limit the use of the residual road network for authorized purposes only. Only in this way can the Grantee assure that chronic dust problems will not occur as a result of the transmission lines.

Environmental Impact of the Action

LO--Lack of Objections

EPA has no objections to the proposed action as described in the draft impact statement; or suggests only minor changes in the proposed action.

ER--Environmental Reservations

EPA has reservations concerning the environmental effects of certain aspects of the proposed action. EPA believes that further study of suggested alternatives or modifications is required and has asked the originating Federal agency to reassess these aspects.

EU--Environmentally Unsatisfactory

EPA believes that the proposed action is unsatisfactory because of its potentially harmful effect on the environment. Furthermore, the Agency believes that the potential safeguards which might be utilized may not adequately protect the environment from hazards arising from this action. The Agency recommends that alternatives to the action be analyzed further (including the possibility of no action at all).

Adequacy of the Impact Statement

Category 1--Adequate

The draft impact statement adequately sets forth the environmental impact of the proposed project or action as well as alternatives reasonably available to the project or action.

Category 2--Insufficient Information

EPA believes that the draft impact statement does not contain sufficient information to assess fully the environmental impact of the proposed project or action. However, from the information submitted, the Agency is able to make a preliminary determination of the impact on the environment. EPA has requested that the originator provide the information that was not included in the draft statement.

Category 3--Inadequate

EPA believes that the draft impact statement does not adequately assess the environmental impact of the proposed project or action, or that the statement inadequately analyzes reasonably available alternatives. The Agency has requested more information and analysis concerning the potential environmental hazards and has asked that substantial revision be made to the impact statement.

If a draft impact statement is assigned a Category 3, no rating will be made of the project or action, since a basis does not generally exist on which to make such a determination.

Figure 3-1. Attachment
Page 2 of 2

## Comments on Items or Issues Raised
## by
## ENVIRONMENTAL PROTECTION AGENCY

Item: Primary concern is that construction and operation would create a dust problem and increase the particulate matter in the air.

Comment: Adequate provisions for dust control are contained in Appendices 6 and 10. Strict adherence to construction guidelines and terms of conditions will be demanded. During the post construction years dust control measures outlined shall be performed as needed.

Item: The road network remaining after construction should be discussed.

Comment: After granting of right-of-way, applicant is required to complete a detailed plan of operation which would include tentative routes of temporary and permanent access roads. Construction procedures developed on existing line construction projects have resulted in a decrease in the number of roads needed and greatly reduces ground disturbance. All the new methods learned in ongoing projects will be followed in constructing this line to minimize both short-term and long-term environmental impacts. Roads not needed for powerline maintenance will be returned to near natural conditions.

Any roads constructed will be permanently closed after construction is completed except if specifically exempted by the Authorized Officer. Some public lands could be closed to vehicle access in accordance with E.O. 11644, Feb. 8, 1972.

Item: TG&E should be required to revegetate, maintain vegetation, and limit use of the remaining roads to insure that chronic dust problems will not occur as a result of the transmission lines.

Comment: Vegetative disturbance will be held to a minimum, as no growth is of sufficient height to need removal on the right-of-way except where necessary for road construction and tower sites. Desert stands of vegetation are sparse and widely scattered. Rainfall generally is too low to anticipate and justify artificial reseeding. Natural vegetation in these areas will take place in years of increased rainfall. Successful revegetation in the desert scrub types is possible in the higher elevations which receive slightly more rainfall.

Seeding of disturbed soil along the proposed right-of-way south of the Pima County line lends itself to success. This area of right-of-way receives over 10 inches of annual precipitation. Areas disturbed and compacted by construction in this zone which, in the opinion of the Authorized Officer, lend themselves to successful revegetation shall be scarified and seeded with forage and game species in accordance with specific instructions and techniques prescribed. Inspection and evaluation of the seeded areas will be made after completion of one growing season to determine if reseeding shall be instigated.

Appropriate changes have been made in the final statement and the proposed stipulations of the right-of-way easement.

**DEPARTMENT OF TRANSPORTATION**
**UNITED STATES COAST GUARD**

MAILING ADDRESS:
U.S. COAST GUARD (G-WS/73)
400 SEVENTH STREET SW.
WASHINGTON, D.C. 20590
PHONE: (202) 426-2262

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Mr. Harold H. Rarnsbacker
Acting State Director
Department of the Interior
Bureau of Land Management
3022 Federal Building
Phoenix, Arizona 85025

Dear Sir:

This is in response to your notice 1792 (911) concerning the draft environmental impact statement for the Tucson Gas & Electric Company - El Sol to Vail, Arizona, 345 kv Transmission Lines.

The Department of Transportation has reviewed the draft statement. We have no comments to offer nor do we have any objection to the project.

The opportunity to review this draft statement is appreciated.

Sincerely,

R. I. PRICE
Captain, U. S. Coast Guard
Deputy Chief, Office of Marine
Environment and Systems
[illegible] the Commandant

## Comments on Items or Issues Raised
## by
## UNITED STATES COAST GUARD

Item: Have no comments or objections.

Comment: None

UNITED STATES DEPARTMENT OF AGRICULTURE
RURAL ELECTRIFICATION ADMINISTRATION
WASHINGTON, D.C. 20250

March 26, 1974

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SUBJECT: Draft Environmental Statement - Tucson Gas and Electric Co. - El Sol to Vail, Arizona, 345 kV Transmission Lines, (Your File 1972 (911))

TO:
Harold H. Rainsbacker
Acting State Director
Bureau of Land Management
U.S. Department of the Interior

We have reviewed the subject draft environmental statement and have no suggestions or comments.

Sincerely,

WALTER J. CLAYTON
Director, Office of Program
Development and Analysis

## Comments on Items or Issues Raised
## by
## RURAL ELECTRIFICATION ADMINISTRATION

| | |
|---|---|
| Item: | Have no suggestions or comments. |
| Comment: | None |

March 3 1849

United States Department of the Interior

NATIONAL PARK SERVICE
WASHINGTON, D.C. 20240

ARIZONA STATE OFFICE
BUREAU OF LAND MANAGEMENT

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IN REPLY REFER TO:
L7619-MQ

28 MAR 1974

Memorandum

To: State Director, Bureau of Land Management, Arizona

Through: Assistant Secretary for Fish and Wildlife and Parks [illegible] 3-28

From: Associate Director

Subject: Review of draft environmental statement on 345 kv transmission line, Vail, Arizona (DES 74-7)

We have reviewed the subject statement and the "Applicant's Environmental Analysis" and are pleased to offer these comments.

Comments on the Proposed Action

The proposed action would not affect any existing, proposed, or known potential units of the National Park System, nor any historical, natural, or environmental education sites listed as national landmarks.

Comments on the Statement

In general, the statement and analysis very satisfactorily deal with the project's impact on historical and archeological resources. However, we do suggest that the final statement specifically mention that the National Register of Historic Places and the State Historic Preservation Officer (Mr. Dennis McCarthy, Director, State Parks Board, 1688 West Adams, Phoenix, Arizona 85007) were consulted to determine the presence or absence of any sites either listed on, nominated to, or in the process of nomination to the National Register of Historic Places.

The final statement should also include a discussion of the results of the archeological survey, along with any measures needed to mitigate the project's impact upon any identified cultural resources.

We appreciate the opportunity to review and comment on the subject draft statement.

JOHNNY HORIZON '76

## Comments on Items or Issues Raised
## by
## NATIONAL PARK SERVICE

Item: The proposal would not affect any existing proposed or known units of the National Park system.

Comment: None.

Item: The final statement should show evidence that the State Parks Board was contacted.

Comment: The Arizona State Parks Board had no comments on the proposal. (See enclosure with letter from Office of Economic Planning and Development (Arizona State Clearinghouse) dated April 4, 1974.)

Item: Final statement should include discussion of results of the archeological survey.

Comment: The survey report was completed on June 15, 1974, and is on file in the Arizona State Office of the Bureau of Land Management. The nature and sensitivity of the information contained in the archeological survey might pose a threat to those identified sites along the route from public exposure if they are included in this statement. Appendix 14 contains an Abstract and Table 1 from the Archeological Survey Report. Table 1 describes each of the archeological sites found.

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
REGIONAL OFFICE
50 FULTON STREET
SAN FRANCISCO, CALIFORNIA 94102

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March 28, 1974

State Director
Bureau of Land Management
U.S. Department of the Interior
Federal Building, Room 3022
Phoenix, Arizona 85025

Dear Sir:

The draft Environmental Impact Statement for the Tucson Gas and Electric Co. - El Sol to Vail, Arizona, 345 Kv. Transmission Lines (INT. DES 74-7) has been reviewed in accordance with HEW procedures as required by CEQ Guidelines, 102(2)(c).

The statement describes the proposed development of a power transmission corridor 185 miles in length and 300 feet in width. Guyed transmission towers 105 feet high will be used to carry the lines. The corridor will pass through the Papago Indian Reservation as well as BLM lands creating the possibility of public, though unauthorized, access to previously unaccessible areas. The statement further identifies considerable nonbeneficial impact to wild life, both land and animal, and the potential human populations that may develop adjacent to the corridor.

It was difficult to evaluate this statement due to the lack of information pertaining to the present energy supply capabilities and demand for the Tucson area. The only information provided is a statement to the effect that the applicant has determined that future demands require this action however, as noted above this is not stated in terms of present requirements and percentage of presently available resources. The absence of population and industrial growth projections make it impossible to evaluate fully the direct and indirect impacts of this proposed action in the Tucson area. It is felt that completion of this project will be highly growth inducing yet no reference is made to the ultimate demand for other services that may result from such growth.

We concur with the statements, eg. page 40, that no beneficial effects will accrue to the land or the natural setting of the proposed corridor area. The periodic patrol by land vehicles as well as aircraft is unlikely adequate to prevent desecration of the land. Are there feasible barriers that can be erected to restrict access to the area except from certain control points? Such a method may prevent the indiscriminate dumping which is apparently an accepted result of this type of construction. It is indicated in the statement that a subsequent and parallel line may be constructed in the future which will potentially aggravate all of the problems which have been identified thus far. This is inadequately described.

Reference is made on page 111 to a final Environmental Impact Statement FES 72-1 for the Navajo Project and to a final Environmental Impact Statement for the 500 Kv. transmission lines from the Navajo Power Plant to the Westwing Substation. At what point will be cumulative effects of these associated actions be evaluated? Separate statements for each portion of this system will make analysis of the total impacts difficult if not impossible. It is felt that increased demographic analysis showing the potential population growth and the resultant increase in services that will be required should be given attention.

The opportunity to review this statement has been appreciated. We look forward to receipt of the final Environmental Impact Statement.

Sincerely,

Robert H. Chang
Assistant Regional Director
for Administration and Management

cc: Phyllis Hayes
Warren Muir

## Comments on Items or Issues Raised
## by
## DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

Item: Completion of the project will be highly growth inducing, yet no reference is made to demands for other services that may result from such growth.

Comment: An analysis of the secondary impacts suggested here would greatly exceed the scope of this environmental impact statement. The decision to build the Navajo Power Plant considered these needs, and distribution lines to the various points of use.

This environmental impact statement has been prepared to help determine the best route and method of getting power from Phoenix to Tucson, considering environmental impacts and all reasonable alternatives.

Item: Could access be restricted to prevent indiscriminate dumping?

Comment: Public lands can be closed to vehicle access in accordance with Executive Order 11644, February 8, 1972, and subsequent regulations. Roads not needed for powerline maintenance will be restored to near natural conditions.

Item: Expresses concern that the cumulative effects of power development and transmission facilities cannot be assessed by having several sections of the overall development analyzed at different times.

Comment: The portion of this statement entitled "Background and History" points out that numerous actions have already been taken. The Navajo Plant is partially completed, and power lines from there to Phoenix are a reality. The scope of this environmental impact statement is to analyze and help select the best route for a transmission line from Phoenix to Tucson.

**ARIZONA**
OFFICE
OF THE
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**OFFICE OF**
**ECONOMIC PLANNING AND DEVELOPMEN**

MAILING ADDRESS: 1645 West Jefferson • Room 428 • Phoenix, Arizona 850

ARIZONA STATE OFFICE
BU. LAND MANAGEMENT
APR 9 '74
SD
ASSOC. SD ✓
PCS
RESOURCES
TECH SER
MGMT SER
PUB. AFF
CF
ACTION
INFO.
SEE ME

April 4, 1974

Mr. Joe T. Fallini
Arizona State Director
Bureau of Land Management
3022 Federal Building
Phoenix, Arizona 85025

Re: Subject: Tucson Gas and Electric - El Sol To Vail -
345kv Transmission Lines
State Application Identifier: 74-80-0001

Dear Mr. Fallini:

The Arizona State Clearinghouse has received and reviewed your notification of proposed action concerning the above project. The Clearinghouse review has generated several responses, copies of which are attached for your information.

In accordance with current requirements as set forth in the Office of Management and Budget Circular A-95, Revised, this letter will serve as the State Clearinghouse comment on the proposal.

Please include the above State Application Identifier in any future correspondence regarding this proposal. Thank you for providing Arizona with the opportunity to comment upon this proposal.

Sincerely yours,

Dennis A Davis

Dennis A. Davis, Executive
Secretary for Federal Programs
DAD:CL:cr

encl:

**1645 West Jefferson, Room 428**: Administration (602) 271-5371 • Development (602) 271-5374 • Motion Picture (602) 271-5011 • Tourism (602) 27
**1624 West Adams, 3rd Floor**: Planning & Clearinghouse (602) 271-5005 • Intergovernmental (602) 271-5939 • Research (602) 271-5001 • Word Center (602) 2

ARIZONA

OFFICE
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OFFICE OF
ECONOMIC PLANNING AND DEVELOPMEN

MAILING ADDRESS: 1645 West Jefferson • Room 428 • Phoenix, Arizona 8500

Date: March 5, 1974

TO:

Mr. Harry Higgins
OEPAD, Planning Division Director
1624 W. Adams Street, Room 309
Phoenix, Arizona 85007

FROM: Clearinghouse Staff Contact: Mrs. Constance LaMonica

SUBJECT: Environmental Statement Review

Applicant: Bureau of Land Management

Project Title: Tucson Gas and Electric
El Sol to Vail, Arizona
345kv Transmission Lines

State Application Identifier: 74-80-0001

A copy of a Draft Environmental Statement is attached for your review and comment in accordance with requirements of OMB Circular A-95. Please review the proposal as it affects the plans and programs of your agency and register your response below. Also note a staff contact within your agency in case further consultation is required. Please return this completed form within fifteen (15) days of your receipt of this request.

☐ No comment on the above project.

☐ Proposal is supported as written.

☒ Comments are attached.

Please contact the Clearinghouse should you desire further information, or need additional time for review.

Review Agency Staff Contact

Authorized Review Agency Signature

Ec. Security
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Az Mining Ass'n
Bureau of Mines
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Civil Rights
Water Resources Management
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Region I, II

**ARIZONA**

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OF THE
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**OFFICE OF**
**ECONOMIC PLANNING AND DEVELOPMEN**

MAILING ADDRESS: 1645 West Jefferson • Room 428 • Phoenix, Arizona 850

MEMORANDUM

TO: Dennis Davis

FROM: Dave Hamernick DH

SUBJECT: Draft Environmental Statement. Tucson Gas and Electric. El Sol to Vail, Arizona. 345 Kv transmission lines. 74-80-0001

DATE: March 20, 1974

I have reviewed the draft statement. It doesn't look like the proposed transmission lines will have a direct impact on any of our current planning projects, with the exception of the natural areas study. The lines will pass through the vicinity of the Sawtooth Mountains, which are recommended for consideration as a natural area by the Arizona Academy of Sciences. Perhaps this should be called to the attention of the Academy and BLM. The Academy might also know if the lines would impact other natural areas.

I did not examine in detail the potential impact of the transmission lines on the vegetation and wildlife. These matters are under the jurisdiction of numerous state and local agencies. I assume they will comment as part of the review process.

This impact statement could perhaps be shown to the Environmental Planning Commission as an example of a project having sufficient magnitude for their consideration.

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**ARIZONA**
OFFICE OF THE GOVERNOR

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**ECONOMIC PLANNING AND DEVELOPMEN**

MAILING ADDRESS: 1645 West Jefferson • Room 428 • Phoenix, Arizona 8500

Date: March 5, 1974

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| [illegible] | BGS |
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| DAG | [illegible] |
| JGL | [illegible] |
| MSA | [illegible] |
| CDC | PLM |
| ~~File~~ | |

TO:

Mr. Wesley E. Steiner, Eng.
State Water Commission
222 N. Central Ave., Suite 800
Phoenix, AZ 85004

FROM: Clearinghouse Staff Contact: Mrs. Constance LaMonica

SUBJECT: Environmental Statement Review

Applicant: Bureau of Land Management

Project Title: Tucson Gas and Electric
El Sol to Vail, Arizona
345kv Transmission Lines

State Application Identifier: 74-80-0001

REC'D ..... DATE ..... BY ..... DATE ..... BY
DAM SUPR.
HYDROLOGY
✓ PLANNING TC
STAFF CONTACT
EXEC. DIR.

ACTION: SUPPORT ..... NO COMMENT ..... COMMENTS ATTACHED

A copy of a Draft Environmental Statement is attached for your review and comment in accordance with requirements of OMB Circular A-95. Please review the proposal as it affects the plans and programs of your agency and register your response below. Also note a staff contact within your agency in case further consultation is required. Please return this completed form within fifteen (15) days of your receipt of this request.

☒ No comment on the above project.

☐ Proposal is supported as written.

☐ Comments are attached.

RECEIVED
MAR 7 1974
Arizona Water Commission

Please contact the Clearinghouse should you desire further information, or need additional time for review.

Review Agency Staff Contact Bob Farrer

Thomas C Clark
Authorized Review Agency Signature

Ec. Security
Power
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Az Mining Assn
Bureau of Mines
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Civil Rights
Watershed Management
Az State Museum
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**ARIZONA**

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# ECONOMIC PLANNING AND DEVELOPMEN

MAILING ADDRESS: 1645 West Jefferson • Room 428 • Phoenix, Arizona 850

Date: March 5, 1974

SLC. ..................
C.A&R ..................
Lease'g ..................
Case Ex. ..................
Doc. Prep. ..................
P. & R. ..................
Appr's'l ..................
S. & Ex. ..................

Res. Mg't. ..................
Forstry ..................
Mineral ..................
F.e. & H ..................
Water ..................
Adm. Serv. ..................
..................
..................

TO:

Mr. Andrew L. Bettwy
Comm., Department of Land
1624 W. Adams St., 4th Floor
Phoenix, Arizona 85007

FROM: Clearinghouse Staff Contact: Mrs. Constance LaMonica

SUBJECT: Environmental Statement Review

Applicant: Bureau of Land Management

Project Title: Tucson Gas and Electric
El Sol to Vail, Arizona
345kv Transmission Lines

State Application Identifier: 74-80-0001

A copy of a Draft Environmental Statement is attached for your review and comment in accordance with requirements of OMB Circular A-95. Please review the proposal as it affects the plans and programs of your agency and register your response below. Also note a staff contact within your agency in case further consultation is required. Please return this completed form within fifteen (15) days of your receipt of this request.

☒ No comment on the above project.

☐ Proposal is supported as written.

☐ Comments are attached.

Please contact the Clearinghouse should you desire further information, or need additional time for review.

Review Agency Staff Contact ____________________

____________________
Authorized Review
Agency Signature

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Az Mining Ass'n
Bureau of Mines
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**ECONOMIC PLANNING AND DEVELOPMEN**

MAILING ADDRESS: 1645 West Jefferson • Room 428 • Phoenix, Arizona 8500

Date: March 5, 1974

TO: Professor David A. King
Department of Watershed Management
College of Agriculture
The University of Arizona
Tucson, Arizona 85721

FROM: Clearinghouse Staff Contact: Mrs. Constance LaMonica

SUBJECT: Environmental Statement Review

Applicant: Bureau of Land Management

Project Title: Tucson Gas and Electric
El Sol to Vail, Arizona
345kv Transmission Lines

State Application Identifier: 74-80-0001

A copy of a Draft Environmental Statement is attached for your review and comment in accordance with requirements of OMB Circular A-95. Please review the proposal as it affects the plans and programs of your agency and register your response below. Also note a staff contact within your agency in case further consultation is required. Please return this completed form within fifteen (15) days of your receipt of this request.

☒ No comment on the above project.

☐ Proposal is supported as written.

☐ Comments are attached.

Please contact the Clearinghouse should you desire further information, or need additional time for review.

Review Agency Staff Contact David A. King

Authorized Review
Agency Signature

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Parks

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Bureau of Mines
Arid Lands
Civil Rights
Watershed Management
Az State Museum
CEPAD
Region I

ARIZONA

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ECONOMIC PLANNING AND DEVELOPMEN

MAILING ADDRESS: 1645 West Jefferson • Room 428 • Phoenix, Arizona 850

Date: March 5, 1974

RECEIVED
ARID LANDS STUDIES

TO:

Mr. K. E. Foster, Ass't Dir.
College of Earth Sciences
Office of Arid Lands Studies
1201 East Speedway
Tucson, Arizona 85719

FROM: Clearinghouse Staff Contact: Mrs. Constance LaMonica

SUBJECT: Environmental Statement Review

Applicant: Bureau of Land Management

Project Title: Tucson Gas and Electric
El Sol to Vail, Arizona
345kv Transmission Lines

State Application Identifier: 74-80-0001

A copy of a Draft Environmental Statement is attached for your review and comment in accordance with requirements of OMB Circular A-95. Please review the proposal as it affects the plans and programs of your agency and register your response below. Also note a staff contact within your agency in case further consultation is required. Please return this completed form within fifteen (15) days of your receipt of this request.

☑ No comment on the above project.

☐ Proposal is supported as written.

☐ Comments are attached.

Please contact the Clearinghouse should you desire further information, or need additional time for review.

Review Agency Staff Contact ____________________

Kennith E. Foster
Authorized Review
Agency Signature

Az Security
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OFFICE
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ECONOMIC PLANNING AND DEVELOPMENT

MAILING ADDRESS: 1645 West Jefferson • Room 428 • Phoenix, Arizona 8500

Date: March 5, 1974

TO:

Mr. Dennis McCarthy, Dir.
Arizona State Parks Board
1688 W. Adams St., Room 109
Phoenix, Arizona 85007

FROM: Clearinghouse Staff Contact: Mrs. Constance LaMonica

SUBJECT: Environmental Statement Review

Applicant: Bureau of Land Management

Project Title: Tucson Gas and Electric
El Sol to Vail, Arizona
345kv Transmission Lines

State Application Identifier: 74-80-0001

A copy of a Draft Environmental Statement is attached for your review and comment in accordance with requirements of OMB Circular A-95. Please review the proposal as it affects the plans and programs of your agency and register your response below. Also note a staff contact within your agency in case further consultation is required. Please return this completed form within fifteen (15) days of your receipt of this request.

☑ No comment on the above project.

☐ Proposal is supported as written.

☐ Comments are attached.

Please contact the Clearinghouse should you desire further information, or need additional time for review.

Review Agency Staff Contact Dennis McCarthy

Authorized Review
Agency Signature

Ec. Security
Power
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Game + Fish
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Az Mining Assn
Bureau of Mines
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Watershed Management
Az State Museum
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Region I, II, I

**ARIZONA**

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*OFFICE OF*
**ECONOMIC PLANNING AND DEVELOPMEN**

MAILING ADDRESS: 1645 West Jefferson • Room 428 • Phoenix, Arizona 85C

Date: March 5, 1974

TO:

Mr. John P. Dickinson
Dept. of Economic Security
Post Office Box 6123
Phoenix, AZ 85005

FROM: Clearinghouse Staff Contact: Mrs. Constance LaMonica

SUBJECT: Environmental Statement Review

Applicant: Bureau of Land Management

Project Title: Tucson Gas and Electric
El Sol to Vail, Arizona
345kv Transmission Lines

State Application Identifier: 74-80-0001

A copy of a Draft Environmental Statement is attached for your review and comment in accordance with requirements of OMB Circular A-95. Please review the proposal as it affects the plans and programs of your agency and register your response below. Also note a staff contact within your agency in case further consultation is required. Please return this completed form within fifteen (15) days of your receipt of this request.

☒ No comment on the above project.

☐ Proposal is supported as written.

☐ Comments are attached.

Please contact the Clearinghouse should you desire further information, or need additional time for review.

Review Agency Staff Contact

John P. Dick

Authorized Review
Agency Signature

Ec. Security
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Bureau of Mines
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MAILING ADDRESS: 1645 West Jefferson • Room 428 • Phoenix, Arizona 8500

Date: March 5, 1974

TO:

Mr. William H. Dresher
Dean, College of Mines
Dir., Az. Bureau of Mines
The University of Arizona
Tucson, Arizona 85721

FROM: Clearinghouse Staff Contact: Mrs. Constance LaMonica

SUBJECT: Environmental Statement Review

Applicant: Bureau of Land Management

Project Title: Tucson Gas and Electric
El Sol to Vail, Arizona
345kv Transmission Lines

State Application Identifier: 74-80-0001

COLLEGE of MINES
UNIVERSITY of
ARIZONA
Mail

A copy of a Draft Environmental Statement is attached for your review and comment in accordance with requirements of OMB Circular A-95. Please review the proposal as it affects the plans and programs of your agency and register your response below. Also note a staff contact within your agency in case further consultation is required. Please return this completed form within fifteen (15) days of your receipt of this request.

☐ No comment on the above project.

☐ Proposal is supported as written.

☒ Comments are attached.

Please contact the Clearinghouse should you desire further information, or need additional time for review.

Review Agency Staff Contact

Dr. Richard T. Moore

Authorized Review
Agency Signature

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THE UNIVERSITY OF ARIZONA
TUCSON, ARIZONA 85721

ARIZONA BUREAU OF MINES
TEL. (602) 884-2733

March 6, 1974

MEMORANDUM

To: Mrs. Constance LaMonica
Clearinghouse Staff Contact

Re: Environmental Statement Review
Tucson Gas & Electric Company
El Sol to Vail, Arizona
345kv Transmission Lines

State Application Identifier: 74-80-0001

The above mentioned Draft Environmental Statement was originally reviewed by the staff of the Arizona Bureau of Mines in November, 1972.

I am attaching a copy of Dr. R. T. Moore's letter to Joe T. Fallini, State Director, dated November 24, 1972, which recounts the findings of the Bureau.

W. H. Dresher
Director

WHD:djm

cc: Dr. R. T. Moore

THE UNIVERSITY OF ARIZONA
TUCSON, ARIZONA 85721

ARIZONA BUREAU OF MINES
TEL. (602) 884-2733

November 24, 1972

Mr. Joe T. Fallini
United States Department
of the Interior
Bureau of Land Management
State Office
3022 Federal Building
Phoenix, Arizona 85025

Dear Mr. Fallini:

This is in response to your letter of November 9, 1972 concerning Tucson Gas and Electic Company's proposed 345kv transmission line from Phoenix to Tucson. I have checked the literature and maps of the area of the proposed route and can fine no evidence that the transmission line will compromise what might be classed as unique geologic phenomenon.

There are several areas along the proposed line, however, that are now or have recently produced mineral commodities of various types and areas of definite potential for mineral production that should be evaluated relative to the power line. These areas and their commodities are listed below. These areas are, of necessity, categorized rather broadly inasmuch as the location of the transmission line is "painted with a broad brush" on the map furnished this office.

S.36, T3N, R1W-S.1, T2N, R1W - known sand and gravel pits
S.1, T2N, R1W to S.36T1N, R2W - potential sand and gravel (aggregate) operations
S.16, T3S, R1E to S.34, T3S, R1E - potential for mica production in vicinity of line
S.26, T7S, R3E to S9, T10S, R6E - marginal potential for base and precious metal deposits
S1 & 7, T9S, RSE and S.33&34, T9S, R6E - past production of manganese
S.13, 14 and 23, 24, T12S, R7E - past fluorspar production
S.19, T14S, R9E to S.13, T15S, R9E - potential for base and precious metal deposits
S.5-6, T16S, R11E - known beryllium deposits
S.13-24, T16S, R12E - known base and precious metal occurrences and strong possibility for major deposits

The possibility that the proposed transmission line will adversely affect the future development of such deposits should be carefully field checked and the relative value of the energy transmitted by the line versus the future need for the mineral resources affected should be carefully weighed.

I trust this information will be of use to you and if we can be of further assistance, please do not hesitate to call upon us.

Sincerely,

Richard T. Moore

Richard T. Moore
Principal Geologist

RTM:fcc

cc: Dr. W. H. Dresher

**ARIZONA**

OFFICE
OF THE
GOVERNOR

OFFICE OF
**ECONOMIC PLANNING AND DEVELOPMENT**

MAILING ADDRESS: 1645 West Jefferson • Room 428 • Phoenix, Arizona 85007

Date: March 5, 1974

TO:

Mr. Ford Smith, Exec. Dir.
Civil Rights Div, Dept of Law
1645 W. Jefferson, Room 140
Phoenix, Arizona 85007

FROM: Clearinghouse Staff Contact: Mrs. Constance LaMonica

SUBJECT: Environmental Statement Review

Applicant: Bureau of Land Management

Project Title: Tucson Gas and Electric
El Sol to Vail, Arizona
345kv Transmission Lines

State Application Identifier: 74-80-0001

A copy of a Draft Environmental Statement is attached for your review and comment in accordance with requirements of OMB Circular A-95. Please review the proposal as it affects the plans and programs of your agency and register your response below. Also note a staff contact within your agency in case further consultation is required. Please return this completed form within fifteen (15) days of your receipt of this request.

☒ No comment on the above project.

☐ Proposal is supported as written.

☐ Comments are attached.

Please contact the Clearinghouse should you desire further information, or need additional time for review.

J. Ford Smith

Review Agency Staff Contact

J. Ford Smith

Authorized Review
Agency Signature

Executive Director

Ec. Security
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Bureau of Mines
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Civil Rights
Watershed Management
Az State Museum
OEPAD
Region I, II, V

ARIZONA

OFFICE
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OFFICE OF
ECONOMIC PLANNING AND DEVELOPMEN

MAILING ADDRESS: 1645 West Jefferson • Room 428 • Phoenix, Arizona 850

Date: March 5, 1974

TO: Mr. Lester S. Ormsby, Administrator
Arizona Power Authority
1810 West Adams Street
Phoenix, Arizona 85015

FROM: Clearinghouse Staff Contact: Mrs. Constance LaMonica

SUBJECT: Environmental Statement Review

Applicant: Bureau of Land Management

Project Title: Tucson Gas and Electric
El Sol to Vail, Arizona
345kv Transmission Lines

State Application Identifier: 74-80-0001

A copy of a Draft Environmental Statement is attached for your review and comment in accordance with requirements of OMB Circular A-95. Please review the proposal as it affects the plans and programs of your agency and register your response below. Also note a staff contact within your agency in case further consultation is required. Please return this completed form within fifteen (15) days of your receipt of this request.

☒ No comment on the above project.

☐ Proposal is supported as written.

☐ Comments are attached.

Please contact the Clearinghouse should you desire further information, or need additional time for review.

Review Agency Staff Contact ______________________

L. Ormsby
Authorized Review
Agency Signature

Ec. Security
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Az Mining Ass'n
Bureau of Mines
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## Comments on Items or Issues Raised
## by
## ARIZONA OFFICE OF ECONOMIC PLANNING AND DEVELOPMENT

The following State agencies responded to OEPAD which serves as the State Clearinghouse in accordance with OMB Circular A-95:

1. OEPAD Planning Director Dave Hamernick

Item: Proposal may affect a proposed natural area under consideration by the Arizona Academy of Sciences in the Sawtooth Mountains.

Comment: The proposal is described in a folder entitled "Sawtooth Mountains Report No. 5," prepared by the Arizona Academy of Science, June 1973. The proposed lines cut across the southwestern corner of the proposed natural area, paralleling an existing road and 230 kv transmission line. The report states, "Construction of a second high voltage transmission line within the existing corridor would have little impact on the Sawtooth Mountains themselves. Some impact on surrounding Creosote bush communities would doubtless occur, partly through increasing accessibility to the area." (Ref. 14.)

2. State Water Commission - No comment

3. State Land Department - No comment.

4. Department of Watershed Management - No comment

5. College of Earth Sciences, Office of Arid Land Studies - No comment.

6. Arizona State Parks Board - No comment.

7. Department of Economic Security - No comment.

8. Arizona Bureau of Mines - Comments already discussed (duplicate letter).

9. Civil Rights Div., Department of Law - No comment

10. Arizona Power Authority - No comment.

United States Department of the Interior

BUREAU OF RECLAMATION
WASHINGTON, D.C. 20240

ARIZONA STATE [illegible]
BU. LAND [illegible]

APR 10 '74

SD
ASSOC. SD
PCS ✓
RESOURCES
TECH SER
MGM'T SER
PUB. AFF
CF
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IN REPLY
REFER TO: 610
120.1

APR 8 1974

Mr. Joe T. Fallini
Arizona State Director
Bureau of Land Management
United States Department of the Interior
Room 3022, Federal Building
Phoenix, Arizona 85025

Dear Mr. Fallini:

In response to your notice received February 14, 1974, we have reviewed your Draft Environmental Statement on the Tucson Gas and Electric Company's El Sol to Vail, Arizona, 345-kV Transmission Lines (DES 74-7).

We have the following comments:

1. The statement should be more self-sustaining to provide ready information to the reviewer without referring him to another document which may not be available. Example: Page 5, C.1. Needs for Power in the Tucson Area. Suggest pages pertaining to the Tucson area be placed in the appendix for quick reference.

2. It is recommended that an additional section be added to the statement to specifically illustrate the favorable or beneficial effects, as follows:

    Favorable Environmental Effects

    A. Benefits of the Project

    1. Tucson Gas and Electric Company's (TG&E) Public Utility Obligation

    a. Certificates of Public Convenience and Necessity

    TG&E legally operates under Certificates of Public Convenience and Necessity issued by the Arizona

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Corporation Commission and contracts with other companies that obligate TG&E to meet the demand for electrical energy within their service area. Failure to meet these obligations can result in the forfeiture of franchise and operating rights, the loss of business and property, and other legal penalties. Failure to provide electrical service would result in serious economic and social dislocation and a way of life throughout the service area. Meeting and fulfilling these obligations are the major benefits of the project.

b. Construction Employment and Expenditures

TG&E lists the commitment on page 11 of $12 million for the construction of the line. This amount, when broken down to indicate cost of materials, labor, and amounts that would be expended within and outside of the construction area, would illustrate both dollar and employment benefits during construction.

c. Operation Employment and Expenditures

Illustrate estimated employment and amounts to be expended for O&M of the line for a period of 1 year and for the life of the project that would benefit the local area.

d. Property Taxes

(1) Construction

Illustrate the estimated amount of property taxes that would be paid during construction.

(2) Operations

Illustrate the amount of property taxes that would be paid for 1 year and the life of the project.

e. Other Benefits

(1) Utilization of coal instead of oil as a main source of fuel that will relieve the oil situation during the energy crisis.

(2) Providing service to pollution control systems such as sewage facilities, etc.

(3) Providing service to schools, hospitals, etc.

3. We believe that the writer may have misinterpreted the definition of mitigation and, by doing so, has overstressed adverse effects of the project that would normally be minimized by proper environmental protective methods. Throughout the statement mitigation is described as protective measures incorporated into the project to minimize adverse impact to the environment. The National Environmental Policy Act requires that all actions associated with a project should be carried out by the lead agency in such a manner as to preserve the existing natural environment to the best of its ability. This would not necessarily be considered mitigation. Mitigation may be defined as measures proposed or required to enhance, protect, or mitigate impacts on features of the project that would compensate or relieve unavoidable environmental impacts caused by the project. Example: This particular project will disturb 326 acres of vegetation during construction. Mitigation for this unavoidable loss could include some type of action to replace the loss. The environmental statement should be revised to reflect what we believe is the more commonly accepted definition of mitigation.

4. Other suggested corrections are as follows:

a. Page 29, last paragraph, second line, change the word "electronic" to "electric."

b. Page 102, paragraph f., the first sentence states, "There may be a loss in value of lands being subdivided or held for speculative appreciation, that are traversed by or are adjacent to this corridor." That sentence sounds contradictory.

c. Page 115, second paragraph, third line, change the figure "135" to "138."

d. Page 126, revise paragraph 5.a. to read as follows:

> Sites suitable for hydroelectric power generation have been utilized in the past. They are now depended upon to supplement the thermoelectric units in times of peak needs. In view of previous action by the Congress, and as no decision has been made to date to build the Bridge Canyon and Marble Canyon Dams, there seems little likelihood that hydroelectric power will be available to Tucson in the foreseeable future.

Sincerely yours,

G G Stamm

Commissioner

## Comments on Items or Issues Raised
by
BUREAU OF RECLAMATION

Item: Statement should be more self-sustaining and not reference other documents.

Comment: The reference item pertains to economic needs justifying additional power. One of the purposes of the draft statement is to show the existence of related material.

Item: Add a section that would illustrate favorable or beneficial effects.

Comment: The power needs in the Tucson area and other beneficial effects which would accrue from additional power in the Tucson area have been fully analyzed in the impact statement on the Navajo Project prepared by the Bureau of Reclamation. The purpose and scope of this statement are limited to analyzing the environmental impacts of transmitting power from Phoenix to Tucson.

Item: Suggested corrections in the text.

Comment: Has been corrected where appropriate.

FEDERAL POWER COMMISSION
WASHINGTON, D.C. 20426

ARIZONA STATE OFFICE
BU. LAND MANAGEMENT
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APR 16 1974

Mr. Joe T. Fallini
Arizona State Director
Bureau of Land Management
Department of the Interior
3022 Federal Building
Phoenix, Arizona 85025

Dear Mr. Fallini:

Subject: FPC Comments - Draft Environmental Impact Statement No. 74-7, El Sol to Vail 345-kV Line

This is in response to your letter requesting comments on the Bureau of Land Management's Draft Environmental Impact Statement (Dept. of the Interior, No. 74-7) related to the proposed 345-kV transmission line between Vail substation near Tucson, Arizona, and El Sol substation near Phoenix, Arizona. The transmission line, which crosses certain Indian lands, is to be constructed and operated by Tucson Gas and Electric Company and will be part of the bulk electric power supply system.

These comments by the Federal Power Commission's Bureau of Power staff are made in compliance with the National Environmental Policy Act of 1969 and the August 1, 1973, Guidelines of the Council on Environmental Quality, and are directed to the need for the proposed 345-kV transmission line as it affects the adequacy and reliability of the bulk power system.

In preparing these comments, the Bureau of Power staff has considered the Bureau of Land Management's Draft Environmental Statement and related reports submitted in accordance with the Commission's Statement of Reliability and Adequacy of Electric Service (Docket No. R-362). The staff bases its evaluation of the need for a bulk power facility upon long-term considerations as well as upon the load-supply situation for the peak load immediately following the availability of the new facility. It should be noted that the useful life of the proposed electric transmission facility is expected to be thirty years or more. During that period, the transmission facility is expected to make a significant contribution to the reliability and adequacy of electric power supply in the region.

Tucson Gas and Electric Company (TG&E) is a member of the Western Systems Coordinating Council (WSCC) which coordinates the planning of members' bulk power facilities. Transmission line interconnections between TG&E and several other electric utility organizations, both private and public, are in existence. Consequently, the TG&E electric transmission facilities operate as an integral part of the bulk electric power system supplying consumers in the interconnected areas.

Historical growth of peak loads in the Arizona-New Mexico area of the WSCC has been approximately 9 percent per year. Increases in load approximating this historical load growth rate are projected for several years into the future. The mitigating effects of current energy conservation measures are not sufficiently known at this time to make accurate long-term predictions. Growth in load will require new transmission line facilities--both to supply local loads and to transmit electrical energy from remote generating stations to load centers in order to provide an acceptable level of adequacy and reliability of service which prudent planning requires.

The Vail to El Sol 345-kV transmission line will serve as an interconnection between Navaho and San Juan generating plants as well as strengthen the interconnections between the Tucson and Phoenix load centers.

The Bureau of Power staff concludes that the planned functions of the subject transmission line are of the nature of those normally provided by electric utilities to provide for projected load growth and to maintain acceptable levels of adequacy and reliability of bulk power systems.

Very truly yours,

T. A. Phillips

T. A. Phillips
Chief, Bureau of Power

## Comments on Items or Issues Raised
by
## FEDERAL POWER COMMISSION

Item: Explains the purpose and need for the proposed lines and concludes that they are of the nature of those normally provided by power companies to provide for reliable power, commensurate with increased demands.

Comment: This is further explained in the text under the section entitled "Background and History."

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
AREA OFFICE
2500 WILSHIRE BOULEVARD, LOS ANGELES, CALIFORNIA 90057

REGIONAL IX
REGIONAL OFFICE
SAN FRANCISCO, CALIFORNIA

**AREA OFFICES:**
Los Angeles, California
San Francisco, California

IN REPLY REFER TO:

APR 26 1974

Mr. Harold H. Raynsbacher
Acting State Director
Bureau of Land Management
U. S. Department of the Interior
Room 3022, Federal Building
Phoenix, Arizona 85025

Dear Mr. Raynsbacher:

Subject: Draft EIS for the Tucson Gas and Electric Transmission Lines

We have completed a review of the environmental assessment for the proposed electrical power transmission lines. It is our understanding that the project will extend a total of 185 miles. The transmission lines will cross the Papago Indian Reservation. Since written consent by the Tribe is required prior to the approval of a right-of-way survey permit, we assume that preliminary agreements have been made.

You have noted that the impact of transmission lines can be lessened if power companies would integrate their transmission and distribution systems. It is not clear that the use of existing rights-of-way for electrical power transmission lines is being maximized.

Please accept our apologies for being late with this response. We hope these comments will be useful to you and would appreciate receiving a copy of the Final Impact Statement for this project when it is completed.

Sincerely,

John E. Bonkoski
Director
Operations Division

ARIZONA STATE OFFICE
BU. LAND MANAGEMENT

APR 29 '74

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ASSOC. SD
FCS 2
RESOURCES 1
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## Comments on Items or Issues Raised
by
## DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

Item: Not clear if existing power line rights-of-way are being used.

Comment: The existing power lines that the proposed route would follow are shown on Map No. 3. Existing lines are paralleled where possible.

Advisory Council
On Historic Preservation
1522 K Street N.W. Suite 430
Washington D.C. 20005

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RESOURCES
TECH SER
MGMT SER
PUB AFF
CI

April 25, 1974

State Director
Bureau of Land Management
U.S. Department of the Interior
Room 3022 Federal Building
Phoenix, Arizona 85025

Dear Sir:

This is in response to your request of February 28, 1974 for comments on the environmental statement for Tucson Gas & Electric Co - El Sol to Vail, Arizona, 345 kv Transmission Lines (INT DES 74-7). Pursuant to its responsibilities under Section 102(2)(C) of the National Environmental Policy Act of 1969, the Advisory Council on Historic Preservation has determined that while you have discussed the historical, architectural, and archeological aspects related to the undertaking, the Advisory Council needs additional information to adequately evaluate the effects on these cultural resources. Please furnish additional data indicating:

a. Compliance with Section 106 of the National Historic Preservation Act of 1966 (16 U.S.C. 470(f)). The Council must have evidence that the most recent listing of the National Register of Historic Places has been consulted (see Federal Register, February 19, 1974, and monthly supplements each first Tuesday thereafter) and that either of the following conditions is satisfied:

   1. If no National Register property is affected by the project, a section detailing this determination must appear in the environmental statement.

   2. If a National Register property is affected by the project, the environmental statement must contain an account of steps taken in compliance with Section 106 and a comprehensive discussion of the contemplated effects on the National Register property. (Procedures for the Protection of Historic and Cultural Properties" are detailed in the Federal Register of January 25, 1974, pp. 3366-3370).

*The Council is an independent unit of the Executive Branch of the Federal Government charged by the Act of October 15, 1966 to advise the President and Congress in the field of Historic Preservation.*

b. Compliance with Executive Order 11593 of May 13, 1971.

1. In the case of land under the control or jurisdiction of the Federal Government, a statement should be made as to whether or not the proposed undertaking will result in the transfer, sale, demolition, or substantial alteration of potential National Register properties. If such is the case, the nature of the effect should be clearly indicated.

2. In the case of lands not under the control or jurisdiction of the Federal Government, a statement should be made as to whether or not the proposed undertaking will contribute to the preservation and enhancement of non-federally owned districts, sites, buildings, structures, and objects of historical, archeological, architectural, or cultural significance.

To insure a comprehensive review of historical, cultural, archeological, and architectural resources, the Advisory Council suggests that the environmental statement contain evidence of contact with the appropriate State Historic Preservation Officer and that a copy of his comments concerning the effects of the undertaking upon these resources be included in the environmental statement. The State Historic Preservation Officer for Arizona is Mr. Dennis McCarthy, Director, State Parks Board, 1688 West Adams, Phoenix, Arizona 85007.

Should you have any questions on these comments or require any additional assistance, please contact Jordan Tannenbaum (202-254-3974) of the Advisory Council staff.

Sincerely yours,

Ann Webster Smith

Ann Webster Smith
Director, Office of Compliance

## Comments on Items or Issues Raised
## by
## ADVISORY COUNCIL ON HISTORIC PRESERVATION

Item: The final statement must contain evidence of compliance with Section 106 of the National Historic Preservation Act of 1966 and Executive Order 11593 of May 13, 1971.

Comment: The National Register of Historic Places has been consulted. The following sites are within the counties that will be traversed by the proposed power lines:

PIMA COUNTY

Santa Rosa vicinity, Ventama Cave, 11 miles west of Santa Rosa, Papago Indian Reservation
Tucson, Cordova House, 173-177 North Meyer Avenue
Tucson, El Tiradito (Wishing Shrine), 221 South Main
Tucson, Fremont House, 145-153 South Main Street
Tucson, The Old Adobe Patio (Charles O. Brown House) 40 West Broadway
Tucson, Old Main, University of Arizona campus
Tucson vicinity, Desert Laboratory, west of Tucson off West Anklam Road
Tucson vicinity, San Xavier del Bac, 9 miles south of Tucson via Mission Road.

PINAL COUNTY

Chandler vicinity, Snaketown, 12 miles southwest of Chandler, Gila River Indian Reservation
Coolidge vicinity, Casa Grande Ruins National Monument, 2 miles north of Coolidge on Arizona 87
Florence vicinity, Adamsville Ruin, 3.5 miles southwest of Florence on Arizona 287.

MARICOPA COUNTY

Gila Bend vicinity, Fortaleza, Gila Bend Indian Reservation
Gila Bend vicinity, Gatlin Site, 3 miles north of Gila Bend
Phoenix, Hohokam-Pima Irrigation sites, Park of the Four Waters
Phoenix, Pueblo Grande Ruin, Washington Avenue, Pueblo Grande City Park
Phoenix, Rosson, Dr. Ronald, House, 139 North Sixth Street
Roosevelt Dam (see Gila County)
Tempe, Farmer-Goodwin House, 820 Farmer Avenue

In addition, BLM has submitted the following for nomination to the National Register of Historic Places:

PINAL COUNTY

Haley Hills Archeological Site
T. 5 S., R. 2 E., Secs. 19 & 30 (160 acres)
To State Liaison Officer, March 25, 1974

Mineral Mountain Archeological Site
T. 3 S., R. 11 E., Sec. 6 (10 acres)
To State Liaison Officer, March 25, 1974

PIMA COUNTY

Cocoraque Butte Archeological Site
T. 14 S., R. 10 E., Sec. 8 (300 acres)
To Denver Service Center, BLM, December 10, 1973

Old Santan (Mission Santa Ana del Chiquiburitac)
T. 12 S., R. 6 E., Sec. 17 (80 acres)
To Denver Service Center, BLM, October 1, 1973

MARICOPA COUNTY - None

The proposed location of the power lines would not adversely affect any of the listed or nominated sites. In order to assure that sites as yet unknown are not disturbed by the power line, a qualified archeologist will accompany staking and construction crews. See letter from Tucson Gas & Electric Company dated May 29, 1974 (immediately following these comments).

Item: Compliance with E.O. 11593.

Comment: As explained above, and in the following letter, a qualified archeologist will accompany staking and construction crews on the power line and any related access roads, staging areas, etc.

Surveys financed by TG&E will be conducted to inventory any archeological resources within and immediately adjacent to the right-of-way in areas not yet surveyed. An archeologist will examine the proposed right-of-way locating archeological sites so that realignment can be considered before the final right-of-way is established. In addition, the archeologist will assist in planning access roads so as to avoid sites.

A second phase of the archeological monitoring program will be to conduct excavations where necessary to avoid destruction of archeological sites. Specific plans for excavations will be made if necessary after the surveys have been completed and all possible realignments of the right-of-way to avoid sites have been considered.

Once the right-of-way has been established and work on the line begins, all construction activities on roads, construction camps, towers and other potentially destructive items, will be conducted in a manner so as to avoid any sites still remaining nearby. State and Federal regulations regarding archeological resources will be followed in all cases.

See following letter dated May 29, 1974, to BLM State Director from Tucson Gas & Electric Company.

TUCSON GAS & ELECTRIC COMPANY
220 WEST SIXTH STREET
P. O. BOX 711
TUCSON, ARIZONA 85702

J. THOMAS VIA, JR.
VICE PRESIDENT

AREA CODE 602
TELEPHONE 622-6661

May 29, 1974

ARIZONA STATE OFFICE
BU. LAND MANAGEMENT
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Mr. Joe Fellini, State Director
Bureau of Land Management
Room 3022 Federal Building
Phoenix, Arizona 85025

Attention: Mr. Myron H. Allen

Gentlemen:

With regard to the El Sol to Vail, Arizona transmission line corridor, I would like to outline the procedure that Tucson Gas & Electric Company is using and will use in conjunction with identification and protection of archaeological values within and adjacent to the right of way:

(1) An archaeological survey has been conducted by the Arizona Museum identifying all archaeological sites within and adjacent to this right of way.

(2) When the survey crew goes into the field for location of towers and for the construction activities to follow, an archaeologist will flag all archaeological sites with special flagging so that they may be identified and protected.

(3) An archaeologist will be in the field with the contractor during construction to respond to any archaeological problems which may develop.

These procedures have been followed in conjunction with the construction of our San Juan transmission line, and we have found that they have resulted in the protection of all archaeological values. They were developed as a result of joint consultation with the Northern Arizona Museum, the Arizona Museum and the Museum of New Mexico.

Should you desire any additional information relative to Tucson Gas & Electric's commitment in protecting archaeological values on the El Sol to Vail transmission line, please let me know.

Sincerely,

J. Thomas Via, Jr.
Vice President

JTV:bp

## Title 43—Public Lands: Interior

**§ 2802.1-6 Indian lands.**

The Bureau of Indian Affairs has jurisdiction over applications for rights-of-way over and upon Indian lands. All applications for the use and occupancy of Indian lands for right-of-way purposes should, therefore, be filed with the Superintendent of the Indian Agency or other superintendent in charge of the reservation on which the lands involved are situated, in accordance with the regulations contained in 25 CFR Part 161.

## PART 2850—POWER TRANSMISSION LINES

**Subpart 2850—Power Transmission Lines, General**

Sec.
2850.0-3 Statutory authority.
2850.0-5 Definitions.
2850.0-8 Lands subject to grant.

**Subpart 2851—Principals and Procedures, Power Transmission Lines**

2851.1 Nature of interest.
2851.1-1 Terms and conditions.
2851.2 Procedures.
2851.2-1 Applications.
2851.3 Boulder Canyon Project.

### Subpart 2850—Power Transmission Lines, General

SOURCE: The provisions of this Subpart 2850 appear at 35 F.R. 9550, June 13, 1970, unless otherwise noted.

**§ 2850.0-3 Statutory authority.**

(b) The act of March 4, 1911 (36 Stat. 1253; 43 U.S.C. 961), as amended, authorizes the head of the department having jurisdiction over the lands, under general regulations fixed by him, to grant an easement for rights-of-way for a period not exceeding 50 years, over and across public lands and reservations of the United States, for poles and lines for the transmission and distribution of electrical power, and for poles and lines for communication purposes and for radio, television and other forms of communication transmitting, relay and receiving structures and facilities to the extent of 200 feet on each side of the center line of such lines and poles and not to exceed four hundred feet by four hundred feet for superstructures and facilities to any citizen, association, or corporation of the United States, where it is intended by such to exercise the use permitted under the act.

# TUCSON GAS & ELECTRIC COMPANY

## 10 YEAR PLAN

## GENERAL STATEMENT

Tucson Gas & Electric Company has currently committed, or has under construction, the following facilities which appear to be excluded when complyin with the ten-year plan submission requirements of Title 40, Chapter, 2, Article 6.2 of the Arizona Revised Statutes

Generation

| | | | |
|---|---|---|---|
| Two | 25 Mw Gas Turbines | Irvington Station | 1972 |
| Three | 25 Mw Gas Turbines | North Loop Substation | 1972 |
| 5% of | 330 Mw Thermal Unit | Northern New Mexico | 1973 |
| 7.5% of | 750 Mw Thermal Unit | Page, Arizona | 1974 |
| 7.5% of | 750 Mw Thermal Unit | Page, Arizona | 1975 |
| 7.5% of | 750 Mw Thermal Unit | Page, Arizona | 1976 |

Transmission & Substations

| Voltage | From Substation | To Substation | Miles | |
|---|---|---|---|---|
| 138 | Northeast | East | 14 | 1973 |
| 345 | San Juan | Vail | 403 | 1974 |
| 345 | Westwing | South | 180 | 1974 |
| 345 | South | Vail | 25 | 1974 |
| 138 | Phase shifting transformer at North Loop | | | 1974 |
| 13.3% of 2 - 500 | Page | Moenkopi & Westwing | | 1974 |

These facilities are either committed with an investment currently greater than $50,000 or are not of large rating, or both, as defined in the Statutes. Other planned installations are listed separately and attached as part of this submission.

## TUCSON GAS & ELECTRIC

## 10 YEAR PLAN

## GENERATION FACILITIES

| | |
|---|---|
| Plant | San Juan Unit #1 |
| Area | Northern New Mexico |
| Capacity - MW | 50% of 330 |
| Number of Units | Second unit of four to be installed |
| Fuel - | |
| a) Type | Coal |
| b) Source | Northern New Mexico area |
| c) Method of Delivery | Truck |
| Water Source | San Juan River |
| Date - | |
| a) Construction to Start | 1974 |
| b) In-Service Date | 1977 |
| Is Certificate Necessary | No. Plant not in Arizona. |

## TUCSON GAS & ELECTRIC

## 10 YEAR PLAN

## GENERATION FACILITIES

| | |
|---|---|
| Plant | San Juan Unit #3 |
| Area | Northern New Mexico |
| Capacity - MW | 50% of 500 |
| Number of Units | Third unit of four to be installed |
| Fuel - | |
| a) Type | Coal |
| b) Source | Northern New Mexico |
| c) Method of Delivery | Truck |
| Water Source | San Juan River |
| Date - | |
| a) Construction to Start | 1976 |
| b) In-Service Date | 1979 |
| Is Certificate Necessary | No. Plant not in Arizona |

# TUCSON GAS & ELECTRIC

## 10 YEAR PLAN

## TRANSMISSION FACILITIES

Line Designation San Juan generation to Vail Substation

Size

| | | |
|---|---|---|
| a) | Voltage | 345,000 |
| b) | Capacity | 400 Mva |
| c) | Point of Origin | Northern New Mexico |
| d) | Point of Termination | Vail, Arizona |
| e) | Length | 403 miles |

Routing This routing will be along the same right-of-way as similar 345,000 volt line between same two points expected to be completed in 1974.

Purpose To deliver energy from generating station to Tucson Gas & Electric Company service area. This is a bulk transmission line in the Western Systems interconnected network.

Date

| | | |
|---|---|---|
| a) | Construction to Start | 1977 |
| b) | In-Service Date | 1979 |

| | | |
|---|---|---|
| Is Certificate Necessary | 256.5 miles in New Mexico: | No |
| | 146.5 miles in Arizona: | Yes |

## TUCSON GAS & ELECTRIC

## 10 YEAR PLAN

## TRANSMISSION FACILITIES

| | | |
|---|---|---|
| Line Designation | | East Loop Substation to Far East Substation |
| Size | | |
| | a) Voltage | 138,000 |
| | b) Capacity | 100 Mva |
| | c) Point of Origin | East Loop Substation (East Tucs |
| | d) Point of Termination | Far East Substation (east of Tuc |
| | e) Length | 8 to 10 miles |
| Routing | | To be determined |
| Purpose | | To provide reliable electrical service to the growing load in th eastern part of TG&E service ar |
| Date | | |
| | a) Construction to Start | 1973 |
| | b) In-Service Date | 1976 |
| Is Certificate Necessary | | Yes |

# TUCSON GAS & ELECTRIC

## 10 YEAR PLAN

## SUBSTATION FACILITIES

| | |
|---|---|
| Terminal Designation | Far East |
| Location | East of Tucson |
| Size | 90 Mva (self-cooled) |
| Voltage | 138 kv - 46 kv - 13.8 kv |
| Number of Lines - | |
| a) Initially | 1 above 115 kv |
| b) Ultimately | 2 above 115 kv |
| Date - | |
| a) Construction to Start | 1973 |
| b) In-Service Date | 1976 |
| Is Certificate Necessary | Yes |

# ARIZONA PUBLIC SERVICE CO.

# TEN YEAR PLAN

# 1972 - 1981

Filed January 31, 1972

For

Power Plant and Transmission Line Siting Committee

A. GENERAL DESCRIPTION

B. GENERATION

C. TRANSMISSION

D. SUBSTATIONS

# ARIZONA PUBLIC SERVICE CO.

# TEN-YEAR PLAN

## General Description

This report is submitted in compliance with Arizona Revised Statutes, Section 40-360.02, relative to Power Plant and Transmission Line Siting. It outlines our plans - covered by the Statute - to meet the ten-year system growth anticipated by Arizona Public Service Company.

As required by the law, this report covers all plans for generating plants with capacity exceeding on hundred megawatts (100 MW), and all transmission lines with capacity of one hundred fifteen thousand volts (115 kv) and related switchyards. Following this section are two maps showing approximate locations of proposed facilities.

In addition to proposed facilities described, the Company does plan the installation of several small turbine units within the 10-year period. These units are necessary to provide reliability of service and economical peaking capability, and each unit will be located at an existing generating station.

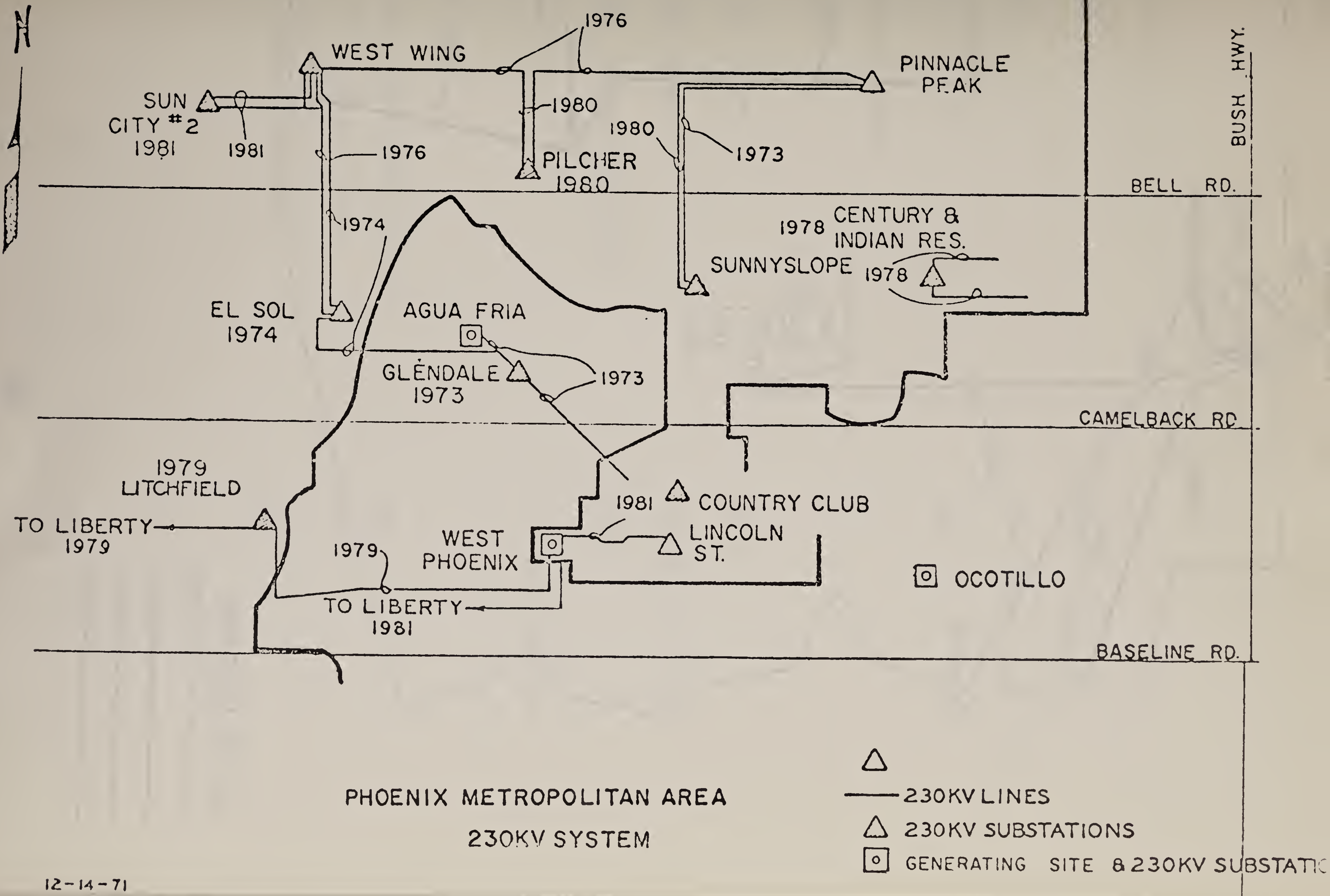
This plan does not include facilities that were under construction at the time the legislation was enacted and which were exempt by the legislation. Major examples are the Navajo Plant (in which APS is a participant) and the Navajo Southern System Transmission Line (which APS is building.) Nor does this plan include planned underground facilities.

A possible power generation source in Southern Utah is not listed herein because it is located outside of Arizona. However, transmission lines required to carry this power within the state are included.

Within the next ten years, other sources of power via interconnection, etc., are under consideration but not planned.

To avoid duplication of costly facilities and to provide a more reliable power network in the state, APS power requirements and planning have been coordinated with the other utilities, primarily through close cooperation among APS, Salt River Project and Tucson Gas & Electric Co.

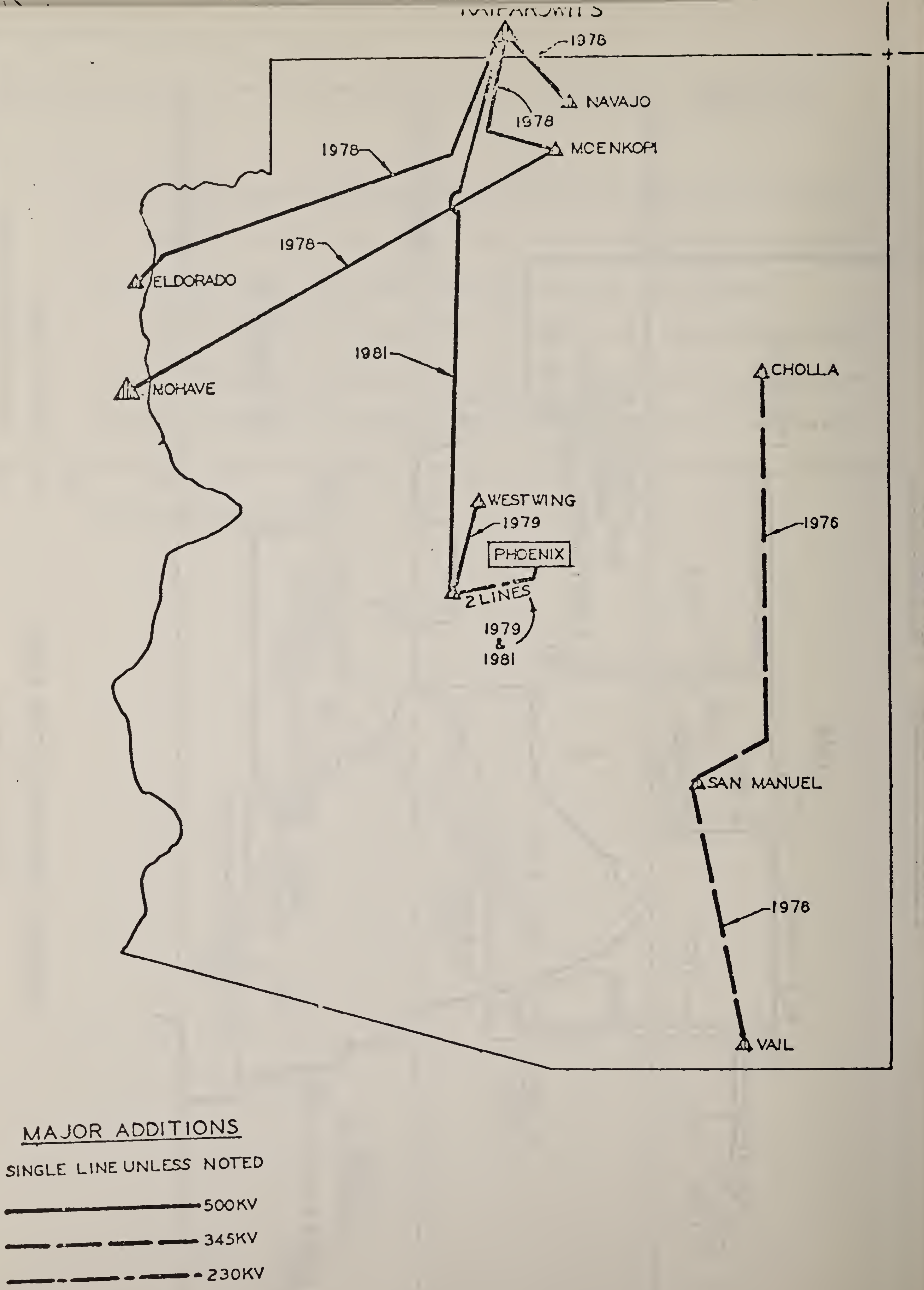
## ARIZONA PUBLIC SERVICE CO



PHOENIX METROPOLITAN AREA

230KV SYSTEM

12-14-71


KAIPAROWITS
1978
NAVAJO
1978
MOENKOPI
1978
1978
ELDORADO
MOHAVE
1981
CHOLLA
WESTWING
1979
1976
PHOENIX
2 LINES
1979 & 1981
SAN MANUEL
1976
VAIL
MAJOR ADDITIONS
SINGLE LINE UNLESS NOTED
500KV
345KV
230KV

# 10 YEAR PLAN

## GENERATION FACILITIES

## 1976

| | |
|---|---|
| Plant | Cholla No. 2 |
| Area | Near Joseph City, Arizona |
| Capacity - MW | 250 |
| Number of Units | 1 |
| Fuel - | |
| a) Type | Coal |
| b) Source | Gallup, N. M. Area |
| c) Method of Delivery | Rail |
| Water Source | Underground at site |
| Date - | |
| a) Construction to Start | 1972 |
| b) In-Service Date | 1976 |
| Is Certificate Necessary | Yes |

# 10 YEAR PLAN

# GENERATION FACILITIES

## 1977

| | |
|---|---|
| Plant | Cholla No. 3 |
| Area | Near Joseph City, Arizona |
| Capacity - MW | 250 |
| Number of Units | 1 |
| Fuel - | |
| a) Type | Coal |
| b) Source | Gallup, N.M. Area |
| c) Method of Delivery | Rail |
| Water Source | Underground at site |
| Date - | |
| a) Construction to Start | 1972 |
| b) In-Service Date | 1977 |
| Is Certificate Necessary | Yes |

# 10 YEAR PLAN

## TRANSMISSION FACILITIES

## 1973

| | |
|---|---|
| Line Designation | Agua Fria to Glendale & Country Club |
| Size | |
| a) Voltage | 230 KV |
| b) Capacity | 275 MVA |
| c) Point of Origin | Sec. 36, T3N, R1E |
| d) Point of Termination | Sec. 32, T2N, R3E |
| e) Length | 9 mi. |
| Routing | To be determined |
| urpose | To provide service to the bulk 230 kv Country Club station, required to supply the increasing APS central Phoenix load, beyond the capability of the existing 69 kv network. This line will improve system reliability by preventing overloads on four central area 69 kv lines, and later serve as an integral part of the Phoenix area 230 KV transmission system. |
| Date | |
| a) Construction to Start | 1972 |
| b) In-Service Date | 1973 |
| Is Certificate Necessary | Yes |

# 10 YEAR PLAN

## TRANSMISSION FACILITIES

## 1973

| | |
|---|---|
| Line Designation | Pinnacle Peak to Sunnyslope |
| Size | |
| a) Voltage | 230 KV |
| b) Capacity | 390 MVA |
| c) Point of Origin | Sec. 10, T4N, R4E |
| d) Point of Termination | Sec. 28, T3N, R3E |
| e) Length | 16 mi. |
| Routing | To be determined |
| Purpose | To supply the 230 KV bulk station Sunnyslope, required to serve the increasing load in the northern are of Metropolitan Phoenix. This loa exceeds the capability of the exist 69 KV network. The line will imp system reliability by preventing o loads on several 69 KV lines serv this area and is an integral link in development of the Phoenix Area 2 transmission system. |
| Date | |
| a) . Construction to Start | 1971 |
| b) In-Service Date | 1973 |
| Is Certificate Necessary | Yes |

## 10 YEAR PLAN

## TRANSMISSION FACILITIES

## 1974

| | |
|---|---|
| Line Designation | El Sol to Agua Fria |
| Size | |
| a) Voltage | 230 KV |
| b) Capacity | 275 MVA |
| c) Point of Origin | Sec. 30, T3N, R1E |
| d) Point of Termination | Sec. 36, T3N, R1E |
| e) Length | 7 mi. |
| Routing | To be determined |
| Purpose | To provide the inter-Phoenix Area 230 KV bulk power stations with a link to El Sol and access to APS Navajo power from West Wing. This line also increases the reliability of the inter-Phoenix 230 KV system and the El Sol Station, plus serving as a fundamental link in the development of the valley bulk power transmission system. |
| Date | |
| a) Construction to Start | 1973 |
| b) In-Service Date | 1974 |
| Is Certificate Necessary | Yes |

## 10 YEAR PLAN

## TRANSMISSION FACILITIES

## 1974

| | |
|---|---|
| Line Designation | West Wing to El Sol |
| Size | |
| a) Voltage | 230 KV |
| b) Capacity | 275 MVA |
| c) Point of Origin | Sec. 12, T4N, R1W |
| d) Point of Termination | Sec. 30, T3N, R1E |
| e) Length | 10.25 mi. |
| Routing | To be determined |
| Purpose | To provide service to the 230 KV bu El Sol station, required to supply the growing Sun City area load, be the capability of the existing 69 K facilities. This line is an integr part of the Phoenix Area 230 KV tra mission system and provides reliabi for the integration of bulk APS Nav power at West Wing into the Valley 230 KV system. |
| Date | |
| a) Construction to Start | 1973 |
| b) In-Service Date | 1974 |
| Is Certificate Necessary | Yes |

# 10 YEAR PLAN

## TRANSMISSION FACILITIES

## 1976

| | |
|---|---|
| Line Designation | West Wing to El Sol |
| Size | |
| a) Voltage | 230 KV |
| b) Capacity | 275 MVA |
| c) Point of Origin | Sec. 12, T4N, R1W |
| d) Point of Termination | Sec. 30, T3N, T1E |
| e) Length | 10.25 mi. |
| Routing | To be determined |
| ırpose | To provide an alternate source and enhance system reliability for the delivery of increased bulk APS Navajo power from West Wing, into the Phoenix area 230 KV transmission system. |
| Date | |
| a) Construction to Start | 1975 |
| b) In-Service Date | 1976 |
| Is Certificate Necessary | Yes |

# 10 YEAR PLAN

## TRANSMISSION FACILITIES

## 1976

| | |
|---|---|
| Line Designation | West Wing to Pinnacle Peak |
| Size | |
| a) Voltage | 230 KV |
| b) Capacity | 275 MVA |
| c) Point of Origin | Sec. 12, T4N, R1W |
| d) Point of Termination | Sec. 10, T4N, R4E |
| e) Length | 22.5 mi. |
| Routing | To be determined |
| Purpose | To provide an alternate source and increase system reliability, for the delivery and integration of both Navajo and Four Corners bulk power, into the Phoenix area 230 KV transmission system. |
| Date | |
| a) Construction to Start | 1975 |
| b) In-Service Date | 1976 |
| Is Certificate Necessary | Yes |

# 10 YEAR PLAN

# TRANSMISSION FACILITIES

## 1976

| | |
|---|---|
| Line Designation | Cholla To San Manuel |
| Size | |
| a) Voltage | 345 KV |
| b) Capacity | 500 MVA |
| c) Point of Origin | Cholla Power Plant, Parts of S½, Sec. 23, & N½ Sec. 26, T18N, R19E |
| d) Point of Termination | San Manuel Substation, S½ S29, T9S, T17E |
| e) Length | 183 mi. |
| Routing | To be determined |
| rpose | It delivers the power from Cholla to the bulk Arizona system and diversifies bulk deliveries around the Phoenix area thus circumventing the problem of bringing all coal generated power into and out of the Phoenix area |
| Date | |
| a) Construction to Start | 1973 |
| b) In-Service Date | 1976 |
| Is Certificate Necessary | Yes |

# 10 YEAR PLAN

## TRANSMISSION FACILITIES

## 1976

| | |
|---|---|
| Line Designation | San Manuel to Vail |
| Size | |
| a) Voltage | 345 KV |
| b) Capacity | 500 MVA |
| c) Point of Origin | San Manuel Substation, S½ S29, T9S |
| d) Point of Termination | Vail Substation, N½ S4, T16S, R15E |
| e) Length | 77 mi. |
| Routing | To be determined |
| Purpose | To deliver Cholla power to souther<br>Arizona and to enhance the reliabi<br>of the EHV bulk transmission syste |
| Date | |
| a) Construction to Start | 1973 |
| b) In-Service Date | 1976 |
| Is Certificate Necessary | Yes |

# 10 YEAR PLAN

## TRANSMISSION FACILITIES

## 1977

| | | |
|---|---|---|
| Line Designation | | Vail to San Xavier |
| Size | | |
| | a) Voltage | 115 kv |
| | b) Capacity | 50 MVA |
| | c) Point of Origin | Sec. 4, T16S, R15E |
| | d) Point of Termination | Sec. 7, T16S, R15E |
| | e) Length | 4 mi. |
| Routing | | |
| urpose | | To deliver Cholla power to the Southern Arizona 115 kv System and thereby enhance the system reliability. |
| Date | | |
| | a) Construction to Start | 1976 |
| | b) In-Service Date | 1977 |
| Is Certificate Necessary | | Yes |

## 10 YEAR PLAN

## TRANSMISSION FACILITIES

## 1978

| | |
|---|---|
| Line Designation | Kaiparowits to Eldorado |
| Size | |
| a) Voltage | 500 KV |
| b) Capacity | 1000 MVA |
| c) Point of Origin | Kaiparowits Plant in Southern Utah |
| d) Point of Termination | Eldorado Switchyard in Southern Ne |
| e) Length | 266 mi. |
| Routing | To be determined |
| Purpose | To transmit Southern California shares of Kaiparowits power to the Southern California systems bulk receiving stations. |
| Date | |
| a) Construction to Start | 1975 |
| b) In-Service Date | 1978 |
| Is Certificate Necessary | Yes |

# 10 YEAR PLAN

## TRANSMISSION FACILITIES

## 1978

| | | |
|---|---|---|
| Line Designation | | Kaiparowits - Navajo 500 KV Line |
| Size | | |
| | a) Voltage | 500 KV |
| | b) Capacity | 1000 MW |
| | c) Point of Origin | Kaiparowits Substation |
| | d) Point of Termination | Navajo Substation |
| | e) Length | 20 Miles |
| Routing | | To be determined |
| urpose | | Required for 500 KV bulk power transmission from Kaiparowits Project to Arizona. |
| Date | | |
| | a) Construction to Start | 1977 |
| | b) In-Service Date | 1978 |
| Is Certificate Necessary | | Yes |

# 10 YEAR PLAN

## TRANSMISSION FACILITIES

## 1978

| | |
|---|---|
| Line Designation | Kaiparowits to Moenkopi |
| Size | |
| a) Voltage | 500 KV |
| b) Capacity | 1000 MVA |
| c) Point of Origin | Kaiparowits Plant in Southern Utah |
| d) Point of Termination | Moenkopi Switchyard, Parts of S4 & T28N, R9E |
| e) Length | 95 mi. |
| Routing | To be determined |
| Purpose | To transmit Southern California shares of Kaiparowits power to the Southern California systems bulk receiving stations. |
| Date | |
| a) Construction to Start | 1975 |
| b) In-Service Date | 1978 |
| Is Certificate Necessary | Yes |

# 10 YEAR PLAN

## TRANSMISSION FACILITIES

## 1978

| | | |
|---|---|---|
| Line Designation | | Moenkopi to Mohave |
| Size | | |
| a) | Voltage | 500 KV |
| b) | Capacity | 1000 MVA |
| c) | Point of Origin | Moenkopi Switchyard, Parts of S4 & S5, T28N, R9E |
| d) | Point of Termination | Mohave Switchyard in Southern Nevada |
| e) | Length | 205 Mi. |
| Routing | | To be determined |
| :pose | | To transmit Southern California shares of Kaiparowits power to the Southern Californis systems bulk receiving stations. |
| Date | | |
| a) | Construction to Start | 1975 |
| b) | In-Service Date | 1978 |
| Is Certificate Necessary | | Yes |

# 10 YEAR PLAN

## TRANSMISSION FACILITIES

## 1978

| | |
|---|---|
| Line Designation | Pinnacle Peak-Ocotillo Tap to Century and Indian Reservation |
| Size | |
| a) Voltage | 230 KV |
| b) Capacity | 275 MVA |
| c) Point of Origin | Sec. 22, T3N, R5E |
| d) Point of Termination | Sec. 21, T3N, R4E |
| e) Length | 8 mi. |
| Routing | To be determined |
| Purpose | To supply the 230 KV Century-Indian Reservation bulk station, required to serve the increasing load in this area, such as the McCormick Ranch community beyond the capacity of the existing 69 facilities. |
| Date | |
| a) Construction to Start | 1977 |
| b) In-Service Date | 1978 |
| Is Certificate Necessary | Yes |

# 10 YEAR PLAN

## TRANSMISSION FACILITIES

## 1979

| | |
|---|---|
| Line Designation | West Phoenix - Litchfield |
| Size | |
| a) Voltage | 230 KV |
| b) Capacity | 275 MVA |
| c) Point of Origin | Sec. 9, T1N, R2E |
| d) Point of Termination | Sec. 3, T1N, R1W |
| e) Length | 15 mi. |
| Routing | To be determined |
| Purpose | To supply the 230 KV Litchfield bulk station, required to serve the increasing load in the Litchfield Park and Coldwater areas in excess of the existing 69 KV system capacity. This line also provides the system reliability to integrate the delivery of bulk power from Liberty, into the Valley 230 KV transmission system. |
| Date | |
| a) Construction to Start | 1978 |
| b) In-Service Date | 1979 |
| Is Certificate Necessary | Yes |

# 10 YEAR PLAN

## TRANSMISSION FACILITIES

## 1979

| | |
|---|---|
| Line Designation | Liberty to Litchfield |
| Size | |
| a) Voltage | 230 KV |
| b) Capacity | 275 MVA |
| c) Point of Origin | Liberty Substation, Sec. 19, T1N, T2 |
| d) Point of Termination | Litchfield, Sec. 3, T1N, R1W |
| e) Length | 12 mi. |
| Routing | To be determined |
| Purpose | To integrate bulk power delivered at Liberty into the Phoenix Area 230 KV transmission system to serve principle bulk stations such as Litchfield. |
| Date | |
| a) Construction to Start | 1978 |
| b) In-Service Date | 1979 |
| Is Certificate Necessary | Yes |

# 10 YEAR PLAN

## TRANSMISSION FACILITIES

## 1979

| | |
|---|---|
| Line Designation | West Wing to Liberty |
| Size | |
| a) Voltage | 230 KV convertible to 500 KV |
| b) Capacity | 350 MVA increased to 1000 MVA by Conversion to 500 KV |
| c) Point of Origin | Sec. 12, T4N, R1W |
| d) Point of Termination | Sec. 19, T1N, R2W |
| e) Length | 30 mi. |
| Routing | To be determined |
| pose | For delivery of bulk power through West Wing and into the Phoenix area bulk 230 KV subtransmission system. This line will be converted to 500 KV to provide EHV transmission system capacity and reliability when Liberty becomes a 500 KV bulk receiving station |
| Date | |
| a) Construction to Start | 1977 |
| b) In-Service Date | 1979 |
| Is Certificate Necessary | Yes |

# 10 YEAR PLAN

## TRANSMISSION FACILITIES

## 1980

| | |
|---|---|
| Line Designation | West Wing - Pinnacle Peak Tap to Pilcher Loop |
| Size | |
| a) Voltage | 230 KV |
| b) Capacity | 275 MVA |
| c) Point of Origin | Sec. 8, T4N, R2E |
| d) Point of Termination | Sec. 32, T4N, R2E |
| e) Length | 3.5 mi. |
| Routing | To be determined |
| Purpose | To provide service to the bulk 230 Pilcher Station, required to suppl the growing load in the North Cent Phoenix area, beyond the capabilit of the existing 69 KV network. Th lines provide an alternate source a enhance the system reliability of loop, for integration into the Pho area 230 KV transmission system. |
| Date | |
| a) Construction to Start | 1979 |
| b) In-Service Date | 1980 |
| Is Certificate Necessary | Yes |

# 10 YEAR PLAN

## TRANSMISSION FACILITIES

## 1980

| | |
|---|---|
| Line Designation | Pinnacle Peak to Sunnyslope |
| Size | |
| a) Voltage | 230 KV |
| b) Capacity | 390 MVA |
| c) Point of Origin | Sec. 10, T4N, R4E |
| d) Point of Termination | Sec. 28, T3N, R3E |
| e) Length | 16 mi. |
| Routing | To be determined |
| Purpose | To provide capacity for the continuing growth in the Sunnyslope area and also to enhance the reliability in both the Sunnyslope and Phoenix Metro areas. |
| Date | |
| a) Construction to Start | 1979 |
| b) In-Service Date | 1980 |
| Is Certificate Necessary | Yes |

# 10 YEAR PLAN

## TRANSMISSION FACILITIES

## 1981

| | |
|---|---|
| Line Designation | West Phoenix to Lincoln St. |
| Size | |
| a) Voltage | 230 KV |
| b) Capacity | 275 MVA |
| c) Point of Origin | Sec. 9, T1N, R2E |
| d) Point of Termination | Sec. 8, T1N, R3E |
| e) Length | 4.6 mi. |
| Routing | Via existing West Phoenix-Lincoln St. corridor |
| Purpose | To provide an alternate source and enhance system reliability, from the expanded APS generation and western bulk power delivery points, into the Phoenix Area 230 Kv transmission sys This line also improves the availabi of local generation. |
| Date | |
| a) Construction to Start | 1980 |
| b) In-Service Date | 1981 |
| Is Certificate Necessary | Yes |

# 10 YEAR PLAN

## TRANSMISSION FACILITIES

## 1981

| | | |
|---|---|---|
| Line Designation | | Kaiparowits to Liberty |
| Size | | |
| a) | Voltage | 500 KV |
| b) | Capacity | 1000 MVA |
| c) | Point of Origin | Kaiparowits Plant in Southern Utah |
| d) | Point of Termination | Liberty Substation, Sec. 19, T1N, R2W |
| e) | Length | 298 mi. |
| Routing | | To be determined |
| pose | | To transmit power from the expanded Kaiparowits plant to Arizona load centers. |
| Date | | |
| a) | Construction to Start | 1978 |
| b) | In-Service Date | 1981 |
| Is Certificate Necessary | | Yes |

# 10 YEAR PLAN

## TRANSMISSION FACILITIES

### 1981

| | |
|---|---|
| Line Designation | West Wing to Sun City No. 2 Loop |
| Size | |
| a) Voltage | 230 KV |
| b) Capacity | 275 MVA |
| c) Point of Origin | Sec. 12, T4N, R1W |
| d) Point of Termination | Sec. 16, T4N, R1W |
| e) Length | 5 mi. |
| Routing | To be determined |
| Purpose | To provide service to the 230 KV City No. 2 bulk station, required supply the increasing load in thi beyond the capability of the two 69 KV lines. These lines provide system reliability to integrate t Sun City No. 2 loop into the Phoe Area 230 KV transmission system. |
| Date | |
| a) Construction to Start | 1980 |
| b) In-Service Date | 1981 |
| Is Certificate Necessary | Yes |

## 10 YEAR PLAN

## TRANSMISSION FACILITIES

## 1981

| | | |
|---|---|---|
| Line Designation | | Liberty to West Phoenix |
| Size | | |
| a) | Voltage | 230 KV |
| b) | Capacity | 275 MVA |
| c) | Point of Origin | Sec. 19, T1N, R2W |
| d) | Point of Termination | West Phoenix Substation, Sec. 9, T1N, R2 |
| e) | Length | 21 mi. |
| Routing | | To be determined |
| urpose | | To deliver power from the Kaiparowits Plant out of Liberty into the expanding Phoenix Area, and also to integrate with the existing 230 KV system thus enhancing reliability. |
| Date | | |
| a) | Construction to Start | 1979 |
| b) | In-Service Date | 1981 |
| Is Certificate Necessary | | Yes |

# 10 YEAR PLAN

## SUBSTATION FACILITIES

## 1973

| | |
|---|---|
| Terminal Designation | Glendale Substation |
| Location | S8, T2N, R2E |
| Size | 100 MVA |
| Voltage | 230 KV |
| Number of Lines - | |
| a) Initially | 2 - 230 KV Bays |
| b) Ultimately | 2 - 230 KV Bays |
| Date - | |
| a) Construction to Start | 1972 |
| b) In-Service Date | 1973 |
| Is Certificate Necessary | Yes |

# 10 YEAR PLAN

## SUBSTATION FACILITIES

## 1973

| | |
|---|---|
| Terminal Designation | Pinnacle Peak Switchyard Addition |
| Location | S10, T4N, R4E |
| Size | |
| Voltage | 230 KV |
| Number of Lines - | |
| a) Initially | 1 - 230 KV Bay |
| b) Ultimately | 3 - 230 KV Bays |
| Date - | |
| a) Construction to Start | 1972 |
| b) In-Service Date | 1973 |
| Is Certificate Necessary | Yes |

# 10 YEAR PLAN

## SUBSTATION FACILITIES

## 1973

| | |
|---|---|
| Terminal Designation | Sunnyslope Substation |
| Location | Sec. 28, T3N, R3E |
| Size | 167 MVA in 1973, 334 MVA in 1975 |
| Voltage | 230 KV |
| Number of Lines - | |
| a) Initially | 1 - 230 KV Bay |
| b) Ultimately | 3 - 230 KV Bays |
| Date - | |
| a) Construction to Start | 1972 |
| b) In-Service Date | 1973 |
| Is Certificate Necessary | Yes |

# 10 YEAR PLAN

## SUBSTATION FACILITIES

## 1974

| | |
|---|---|
| Terminal Designation | El Sol Substation |
| Location | S30, T3N, R1E |
| Size | 167 MVA in 1974, 334 MVA in 1977 |
| Voltage | 230 KV |
| Number of Lines - | |
| a) Initially | 2 - 230 KV Bays |
| b) Ultimately | 3 - 230 KV Bays |
| Date - | |
| a) Construction to Start | 1973 |
| b) In-Service Date | 1974 |
| Is Certificate Necessary | Yes |

# 10 YEAR PLAN

## SUBSTATION FACILITIES

## 1976

| | |
|---|---|
| Terminal Designation | Cholla Substation Addition |
| Location. | Sec. 23 & 26, T18N, R19E |
| Size | 250 MVA in 1976; 250 MVA in 1977 |
| Voltage | 345 KV |
| Number of Lines - | |
| a) Initially | 1 - 345 KV Bay |
| b) Ultimately | 1 - 345 KV Bay |
| Date - | |
| a) Construction to Start | 1974 |
| b) In-Service Date | 1976 |
| Is Certificate Necessary | Yes |

# 10 YEAR PLAN

## SUBSTATION FACILITIES

## 1976

| | |
|---|---|
| Terminal Designation | San Manuel |
| Location. | Sec. 29, T9S, R17E |
| Size | 400 MVA |
| Voltage | 345 KV |
| Number of Lines - | |
| a) Initially | 2 -345 KV Bays, 1 -230 KV Bay, 1 -115 KV Bay |
| b) Ultimately | 2 -345 KV Bays, 1 -230 KV Bay, 1 -115 KV Bay |
| e - | |
| a) Construction to Start | 1974 |
| b) In-Service Date | 1976 |
| Is Certificate Necessary | Yes |

# 10 YEAR PLAN

## SUBSTATION FACILITIES

## 1976

| | |
|---|---|
| Terminal Designation | Vail Switchyard |
| Location. | Sec.4, T16S, R15E |
| Size | |
| Voltage | 345 KV |
| Number of Lines - | |
| a) Initially | 1 - 345 KV Bay |
| b) Ultimately | 2 - 345 KV Bay |
| Date - | |
| a) Construction to Start | 1974 |
| b) In-Service Date | 1976 |
| Is Certificate Necessary | Yes |

# 10 YEAR PLAN

## SUBSTATION FACILITIES
## 1977

| | |
|---|---|
| Terminal Designation | San Xavier Switching Station |
| Location | Sec. 7, T16S, R15E |
| Size | |
| Voltage | 115 kv |
| Number of Lines - | |
| a) Initially | 1 - 115 kv Bay |
| b) Ultimately | 2 - 115 kv Bays |
| Date - | |
| a) Construction to Start | 1975 |
| b) In-Service Date | 1977 |
| Is Certificate Necessary | Yes |

## 10 YEAR PLAN

## SUBSTATION FACILITIES

## 1978

| | |
|---|---|
| Terminal Designation | Century and Indian Reservation |
| Location | S21, T3N, R4E |
| Size | 100 MVA in 1978 |
| Voltage | 230 KV |
| Number of Lines - | |
| a) Initially | 2 - 230 KV Bays |
| b) Ultimately | 2 - 230 KV Bays |
| Date - | |
| a) Construction to Start | 1976 |
| b) In-Service Date | 1978 |
| Is Certificate Necessary | Yes |

# 10 YEAR PLAN

## SUBSTATION FACILITIES

## 1979

| | |
|---|---|
| Terminal Designation | West Phoenix Switchyard Addition |
| Location | S9, T1N, R2E |
| Size | 167 MVA in 1979. |
| Voltage | 230 KV |
| Number of Lines - | |
| a) Initially | 1 - 230 KV Bay |
| b) Ultimately | 4 - 230 KV Bays |
| Date - | |
| a) Construction to Start | 1977 |
| b) In-Service Date | 1979 |
| Is Certificate Necessary | Yes |

## 10 YEAR PLAN

## SUBSTATION FACILITIES

## 1979

| | |
|---|---|
| Terminal Designation | Litchfield |
| Location | S3, T1N, R1W |
| Size | 167 MVA |
| Voltage | 230 KV |
| Number of Lines - | |
| a) Initially | 2 - 230 KV Bays |
| b) Ultimately | 2 - 230 KV Bays |
| Date - | |
| a) Construction to Start | 1977 |
| b) In-Service Date | 1979 |
| Is Certificate Necessary | Yes |

## 10 YEAR PLAN

## SUBSTATION FACILITIES

## 1979

| | |
|---|---|
| Terminal Designation | Liberty Switchyard |
| Location. | S19, T1N, R2W |
| Size | |
| Voltage | 230 KV |
| Number of Lines - | |
| a) Initially | 2 - 230 KV Bay |
| b) Ultimately | 2 - 230 KV Bays , 2 - 500 KV Bays |
| .te - | |
| a) Construction to Start | 1977 |
| b) In-Service Date | 1979 |
| Is Certificate Necessary | Yes |

# 10 YEAR PLAN

## SUBSTATION FACILITIES

## 1980

| | |
|---|---|
| Terminal Designation | Pilcher Substation |
| Location | S32, T4N, R2E |
| Size | 100 MVA |
| Voltage | 230 KV |
| Number of Lines - | |
| a) Initially | 2 - 230 KV Bays |
| b) Ultimately | 2 - 230 KV Bays |
| Date - | |
| a) Construction to Start | 1978 |
| b) In-Service Date | 1980 |
| Is Certificate Necessary | Yes |

# 10 YEAR PLAN

## SUBSTATION FACILITIES

## 1981

| | |
|---|---|
| Terminal Designation | Sun City No. 2 |
| Location | S16, T4N, R1W |
| Size | 100 MVA |
| Voltage | 230 KV |
| Number of Lines - | |
| a) Initially | 2 - 230 KV Bays |
| b) Ultimately | 2 - 230 KV. Bays |
| Date - | |
| a) Construction to Start | 1979 |
| b) In-Service Date | 1981 |
| Is Certificate Necessary | Yes |

B.L.M. LA
AUG 2
10:00 A
PHOENIX, AR

Appendix 4 - TG&E Application (across national resource lands)

A 7274

## APPLICATION FOR GRANT OF RIGHT-OF-WAY FOR ELECTRIC TRANSMISSION LINES

TUCSON GAS & ELECTRIC COMPANY, of Tucson, Arizona, a corporation duly organized and existing under and by virtue of the laws of the State of Arizona, with offices and principal place of business at 220 West 6th Street, Tucson, Arizona, hereby files and makes application for a grant of right-of-way, as hereinafter described, pursuant to the Act of Congress of March 4, 1911 (43 USC 961), as amended; and in accordance with the Regulations of the Secretary of the Interior, Part 2850, and following, Title 43, Code of Federal Regulations.

(1) Applicant shows that those terms and conditions and the stipulations imposed pursuant to Section 2851.1-1(5), 43 CFR 2234.4-1(c) (5) (ii), 36 CFR 251.52 (b), 36 CFR 251.52 (d) (2), 25 CFR 161.27 (b), 25 CFR 161.27 (f) (2), 43 CFR 2234.1-3 (c) (13) or F. R. Doc. 67-3666 filed April 3, 1967, 32 F. R. 5520, have been previously waived so as to be eliminated from this application, by Letter Agreement executed October 2, 1969, in the Office of the Secretary of the Interior, by the United States, Tucson Gas and Electric Company, El Paso Electric Company, and Public Service Company of New Mexico, reference to which document is here made for all purposes.

(2) The primary purpose for which the right-of-way is to be used is the construction, maintenance, and operation of two certain 345KV electric transmission lines to be located on, over and through the following described public lands under the jurisdiction of the Bureau of Land Management of the Department of the Interior:

## MARICOPA COUNTY, ARIZONA

Sections 1, 12, 13, 24, 25, and 36, in Township 1 South, Range 2 West, of the Gila and Salt River Meridian;

Sections 5, 6, 8, 9, 14, 15, 23, and 24, in Township 2 South, Range 1 West of the Gila and Salt River Meridian;

Sections 30, 31, and 32, in Township 2 South, Range 1 East, of the Gila and Salt River Meridian;

Sections 5, 8, 9, 16, 21, 22, 27, 34, and 35, in Township 3 South, Range 1 East, of the Gila and Salt River Meridian;

Section 11, in Township 4 South, Range 1 East, of the Gila and Salt River Meridian;

## PINAL COUNTY, ARIZONA

Sections 30 and 31, in Township 4 South, Range 2 East, of the Gila and Salt River Meridian;

Sections 5, 6, and 8, in Township 5 South, Range 2 East, of the Gila and Salt River Meridian;

Sections 23 and 25, in Township 6 South, Range 2 East, of the Gila and Salt River Meridian;

Sections 8, 17, 21, 22, 25, 26, and 27, in Township 7 South, Range 3 East, of the Gila and Salt River Meridian;

Sections 30 and 31, in Township 7 South, Range 4 East, of the Gila and Salt River Meridian;

Sections 30 and 31, in Township 9 South, Range 6 East, of the Gila and Salt River Meridian;

Sections 5, 8, and 9, in Township 10 South, Range 6 East, of the Gila and Salt River Meridian;

## PIMA COUNTY, ARIZONA

Sections 17, 18, 20, 28, 29, and 33, in Township 11 South, Range 7 East, of the Gila and Salt River Meridian;

Sections 33 and 34, in Township 14 South, Range 9 East, of the Gila and Salt River Meridian;

Section 1, in Township 15 South, Range 9 East, of the Gila and Salt River Meridian;

Section 25, in Township 15 South, Range 10 East, of the Gila and Salt River Meridian;

Section 31, in Township 15 South, Range 11 East, of the Gila and Salt River Meridian;

Section 4, in Township 16 South, Range 11 East, of the Gila and Salt River Meridian;

Comprising a total of 60 sections under the jurisdiction of the Bureau of Land Management traversed an estimated distance of 48.75 miles by the proposed 345 KV electric transmission lines. Width of right-of-way requested is 330 feet.

(3) This application is filed in accordance with the provisions of Subpart 1821, Chapter II, Title 43, Code of Federal Regulations.

(4) Check in the amount of $10.00 is attached hereto in accordance with Section 2802.1-2, Subpart 2802, Title 43, Code of Federal Regulations, to cover cost of application service fee.

(5) A copy of the charter of Tucson Gas and Electric Company, duly certified by the proper State officer of the State of Arizona, is attached hereto and made a part hereof in accordance with Section 2802.1-3(a) of Subpart 2802, Chapter II, Title 43, Code of Federal Regulations.

(6) A copy of the Resolution of Tucson Gas & Electric Company authorizing the filing of this application is attached hereto and filed herewith in accordance with Section 2802.1-3(d), Subpart 2802, Chapter II, Title 43, Code of Federal Regulations.

(7) The following described maps showing the location of the proposed right-of-way are enclosed herewith and made a part hereof:

> Quadrangles entitled Phoenix, NI 12-7; Mesa, NI 12-8; Ajo, NI 12-10; Tucson, NI 12-11, of the Western United States 1:250,000, published by U. S. Geological Survey, Denver, Colorado.

Maps in compliance with the specifications of Section 2802.1-5 Subpart 2802, Chapter II, Title 43, Code of Federal Regulations, are in the process of preparation by survey on the ground and will be submitted as soon as completed.

(8) A detailed description of the environmental impact of the project on airspace, air and water quality, scenic and esthetic features, historical and archeological features, wildlife, fish and marine life, among other things, is in the process of preparation by the Bureau of

Land Management of the Department of the Interior, Phoenix, Arizona. The environmental impact study will be compiled in accordance with the requirements of the Environmental Policy Act of 1969, and Section 2851.2-1(6)(i), Part 2850, Chapter II, Title 43, Code of Federal Regulations, and will be submitted when completed.

(9) The application is for a width of 330 feet for the proposed right-of-way, and the 330 foot width is required in order to: (a) provide adequate space for construction, maintenance, and operation of the electric transmission line; (b) to provide space for an additional electric transmission line having similar characteristics, if and when the same is required.

(10) The term requested for said right-of-way is 50 years with renewal clause, all as provided by Section 2851.1(b) of Title 43, Code of Federal Regulations.

(11) Applicant requests that the fair market value of the permit, right-of-way, or easement be determined by appraisal by the authorized officer, as provided by Section 2802.1-7, Subpart 2802, Chapter II, Title 43, Code of Federal Regulations, and that applicant be informed of the requirements of such officer with reference to the payment thereof.

(12) Applicant shows in accordance with Section 2851.2-1(c)(1), Subpart 2851, Chapter II, Title 43, Code of Federal Regulations that the connecting generating plant which will generate the power to be transmitted over such line will be the Navajo Generating Station now under construction East of Antelope Creek and approximately four miles East of Page, Arizona.

The station will consist of three generating units each with an estimated net output of 770,000 kilowatts. Total net capacity of the station will be 2,310,000 kilowatts.

Separate boilers for each unit will each have a heat output of 6,186,000,000 BTU per hour, and a steam capacity of 5,535,000 pounds per hour.

The turbines for all three units are the type known as tandem compound, four flow, 33½. They will have a steam temperature of 1,000 degrees F., and a reheat temperature of 1,000 degrees F. The steam pressure is 3,500 psig at the inlet of the high pressure turbines.

Each of the three generators will operate at 24,000 volts at a speed of 3,600 rpm. The stator will be water cooled while the rotor will be cooled by hydrogen at 75 psig. Each unit will weight 446 tons.

The stations will have six cooling towers - two for each generating unit. Towers will be of the cross flow, induced draft type, with 10 cells each. They will be 35 feet high, 71 feet wide, 401 feet long, and will have a water flow of 271,000 gallons per minute per unit.

Water supply will be pumped approximately 3 miles to the station from Lake Powell. Consumptive use of up to 34,100 acre feet annually is permitted under the Water Service Agreement with the United States.

(13) Applicant shows in accordance with Section 2851.2-1(c)(1) of Subpart 2851, Chapter II, Title 43, Code of Federal Regulations that the transmission lines for which the right-of-way is requested will originate at West Wing Substation located in Section 12, Township 4 North, Range 1 West, Maricopa, Arizona, approximately 18 miles northwest of the center

of the City of Phoenix, Arizona. Said right-of-way will extend in a generally Southeasterly direction, a distance of approximately 170 miles to a terminus at the Vail Substation located in Section 4, Township 16 South, Range 15 East, Pima County, Arizona, approximately 12 miles Southeast of the City of Tucson, Arizona.

Said transmission lines will consist of guyed towers with conductors arranged in a delta or equilateral triangle configuration. Each of the lines will operate at a nominal phase-to-phase voltage of 345 kilovolts, a maximum phase-to-phase voltage of 362 kilovolts, and a nominal phase-to-phase voltage of approximately 200 kilovolts. Each phase has two conductors which are 954,000 circular mils ACSR (aluminum conductor steel reinforced. The three-phase conductors are located at the corners of an equilateral triangle which is approximately 30 feet on a side. Each phase consists of two-conductor bundle, with the conductors in a horizontal plane and spaced 18 inches apart. Corona free spacers will be located at 200 feet intervals to keep the two conductors of each phase from contacting each other. Each conductor is 1.18 inches in diameter.

The towers will be designed in sections so that they can be field assembled. Each single tower structure is supported by four galvanized steel guy cables anchored to the ground. Tower spacing will be typically 200 feet, with a maximum of 2000 feet.

The transmission lines will be for applicant's own use in furnishing electric power for its distribution system pursuant to the Franchise issued by the Corporation Commission of the State of Arizona.

LAND MANAGEME A 7872

1974 FEB 28 AM 11 29 .7

LAND OFFICE
PHOENIX, ARIZONA

## APPLICATION FOR GRANT OF RIGHT-OF-WAY FOR ELECTRIC TRANSMISSION LINE

TUCSON GAS & ELECTRIC COMPANY, of Tucson, Arizona, a corporation duly organized and existing under and by virtue of the laws of the State of Arizona, with offices and principal place of business at 220 West 6th Street, Tucson, Arizona, hereby files and makes application for a grant of right-of-way, as hereinafter described, pursuant to the Act of Congress of March 4, 1911 (43 USC 961), as amended; and in accordance with the Regulations of the Secretary of the Interior, Part 2850, and following, Title 43, Code of Federal Regulations.

(1) Applicant shows that those terms and conditions and the stipulations imposed pursuant to Section 2851.1-1 (5), 43 CFR 2234.4-1 (c) (5) (ii), 36 CFR 251.52 (b), 36 CFR 251.52 (d) (2), 25 CFR 161.27 (b), 25 CFR 161.27 (f) (2), 43 CFR 2234.1-3 (c) (13) or F. R. Doc. 67-3666 filed April 3, 1967, 32 F. R. 5520, have been previously waived so as to be eliminated from this application, by Letter Agreement executed October 2, 1969, in the Office of the Secretary of the Interior, by the United States, Tucson Gas & Electric Company, El Paso Electric Company, and Public Service Company of New Mexico, reference to which document is here made for all purposes.

(2) The primary purpose for which the right-of-way is to be used is the construction, maintenance, and operation of one certain 500 KV electric transmission line to be located on, over and through the following described public lands under the jurisdiction of the Bureau of Land Management of the Department of the Interior:

# MARICOPA COUNTY, ARIZONA

| AP Nº | PARCEL | SECTION | TOWNSHIP | RANGE | WIDTH | DISTANCE | ACRE |
|---|---|---|---|---|---|---|---|
| | MA-5 | 13 | 2-N | 1-W | 210' | 2460.18 | 11.8 |
| | MA-7 | 13 & 24 | 2-N | 1-W | 210' | 1518.53 | 7.2 |
| & 4 | MA-35 | 1, 12, 11, 14, 23, 24, 25 & 36 | 1-S | 2-W | 210' | 33179.34 | 159.9 |
| | MA-35 | 6 & 5 | 2-S | 1-W | 210' | 6978.84 | 33.6 |
| | MA-37 | 9 & 10 | 2-S | 1-W | 210' | 7947.14 | 38.3 |
| | MA-39 | 11, 12, 13 | 2-S | 1-W | 210' | 13116.97 | 63.2 |
| | MA-41 | 19, 30, 29, 32 & 33 | 2-S | 1-E | 210' | 18823.49 | 90.7 |
| | MA-41 | 4, 9, 16, 21, 28, 27, 34, & 35 | 3-S | 1-E | 210' | 34670.15 | 167.1 |
| | MA-43 | 1 & 12 | 4-S | 1-E | 210' | 7706.04 | 37.1 |

126,400.68 feet
23.940 miles
609.269 acres

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# PINAL COUNTY, ARIZONA

| AP Nº | PARCEL | SECTION | TOWNSHIP | RANGE | WIDTH | DISTANCE | AC |
|---|---|---|---|---|---|---|---|
| 8 | PL-7 | 19, 30, 31 | 4-S | 2-E | 210' | 13319.82 | 64. |
| 8 | PL-8 | 6 & 7 | 5-S | 2-E | 210' | 10910.80 | 52. |
| 9 | PL-18 | 19 & 30 | 5-S | 2-E | 210' | 10931.62 | 52. |
| 9 | PL-19 | 30, 31, 32 | 5-S | 2-E | 210' | 6294.45 | 30. |
| ) | PL-24 | 9 | 6-S | 2-E | 210' | 2639.31 | 12. |
| ) | PL-27 | 21, 28, 33 | 6-S | 2-E | 210' | 16514.94 | 79. |
| ) | PL-27 | 4 | 7-S | 2-E | 210' | 395.81 | 1. |
| &<br>7 | PL-30 | 12 | 7-S | 2-E | 210' | 3428.90 | 16. |
|  | PL-31 | 12 | 7-S | 2-E | 210' | 1547.91 | 7. |
| 1 | PL-32 | 12 | 7-S | 2-E | 210' | 400.40 | 1. |
| 1 | PL-33 | 7, 18, 17 | 7-S | 3-E | 210' | 11721.27 | 56. |
|  | PL-35 | 21, 22, 23<br>26 & 25 | 7-S | 3-E | 210' | 21328.69 | 102. |
|  | PL-35 | 30 & 31 | 7-S | 4-E | 210' | 6232.70 | 30. |
|  | PL-39 | 30 & 31 | 9-S | 6-E | 210' | 9207.49 | 44. |
|  | PL-41 | 5, 8, 9 | 10-S | 6-E | 210' | 12442.43 | 59. |

127,316.54 feet
24.113 miles
613.796 acres

# PIMA COUNTY, ARIZONA

| AP Nº | PARCEL | SECTION | TOWNSHIP | RANGE | WIDTH | DISTANCE | ACR |
|---|---|---|---|---|---|---|---|
| 5 | PM-4 | 18, 19, 30 | 11-S | 7-E | 210' | 10084.88 | 48.6 |
| 5 | PM-5 | 29 | 11-S | 7-E | 210' | 5079.11 | 24.4 |
| 5 | PM-7 | 33 | 11-S | 7-E | 210' | 897.52 | 4. |
| 9 | PM-9 | 33, 34, 35 | 14-S | 9-E | 210' | 9293.43 | 44.8 |
| 9 | PM-9 | 3 | 15-S | 9-E | 210' | 73.15 | 0.4 |
| 0 | PM-13A | 25 | 15-S | 10-E | 210' | 200.00 | 0.6 |
| 0 | PM-14A | 6 | 16-S | 11-E | 210' | 3138.50 | 15.1 |
| 1 | PM-19 | 35 | 16-S | 11-E | 210' | 6855.59 | 33.0 |
| 1 | PM-23 | 23 | 17-S | 12-E | 210' | 2656.80 | 12.8 |
| 2 | PM-25 | 24 | 17-S | 12-E | 210' | 3923.85 | 18.9 |

42,202.83 feet
7.993 miles
203.250 acres

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LAND OFFICE
PHOENIX, ARIZONA

(3) This application is filed in accordance with the provisions of Subpart 1821, Chapter II, Title 43, Code of Federal Regulations.

(4) Check in the amount of $10.00 is attached hereto in accordance with Section 2802.1-2, Subpart 2802, Title 43, Code of Federal Regulations, to cover cost of application service fee.

(5) A copy of the charter of Tucson Gas & Electric Company, duly certified by the proper State officer of the State of Arizona, is attached hereto and made a part hereof in accordance with Section 2802.1-3 (a) of Subpart 2802, Chapter II, Title 43, Code of Federal Regulations.

(6) A copy of the Resolution of Tucson Gas & Electric Company authorizing the filing of this application is attached hereto and filed herewith in accordance with Section 2802.1-3 (d), Subpart 2802, Chapter II, Title 43, Code of Federal Regulations.

(7) Maps in compliance with the specifications of Section 2802.1-5 of Subpart 2802, Chapter II, Title 43, Code of Federal Regulations, are attached entitled 345 KV - 500 KV Westwing-Vail Transmission Project, Sheets 1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14, 15, 19, 20, 21 and 22.

(8) A detailed description of the environmental impact of the project on airspace, air and water quality, scenic and esthetic features, historical and archaeological features, wildlife, fish and marine life, among other things, is in the process of preparation by the Bureau of Land Management of the Department of the Interior, Phoenix, Arizona. The environmental impact study will be compiled in accordance with the requirements of the

Environmental Protection Act of 1969, and Section 2851.2-1 (6) (i), Part 2850, Chapter II, Title 43, Code of Federal Regulations, and will be submitted when completed.

(9) The application is for a width of 210 feet for the proposed right-of-way, and the 210 foot width is required in order to provide adequate space for construction, maintenance and operation of the electric transmission line and partially overlaps on the adjoining right-of-way to be granted for a 345 KV transmission line.

(10) The term requested for said right-of-way is 50 years with renewal clause, all as provided by Section 2851.1 (b) of Title 43, Code of Federal Regulations.

(11) Applicant requests that the fair market value of the permit, right-of-way, or easement be determined by appraisal by the authorized officer, as provided by Section 2802.1-7, Subpart 2802, Chapter II, Title 43, Code of Federal Regulations, and that applicant be informed of the requirements of such officer with reference to the payment thereof.

(12) Applicant shows in accordance with Section 2851.2-1 (c) (1), Subpart 2851, Chapter II, Title 43, Code of Federal Regulations, that the connecting generating plant which will generate the power to be transmitted over such line will be the Navajo Generating Station now under construction east of Antelope Creek and approximately four miles east of Page, Arizona, and other generating facilities.

The station will consist of three generating units each with an estimated net output of 770,000 kilowatts. Total net capacity of the station will be 2,310,000 kilowatts.

Separate boilers for each unit will each have a heat output of 6,186,000,000 BTU per hour, and a steam capacity of 5,535,000 pounds per hour.

The turbines for all three units are the type known as tandem compound, four flow, 33-1/2. They will have a steam temperature of 1,000 degrees F., and a reheat temperature of 1,000 degrees F. The steam pressure is 3,500 psig at the inlet of the high pressure turbines.

Each of the three generators will operate at 24,000 volts at a speed of 3,600 rpm. The stator will be water cooled while the rotor will be cooled by hydrogen at 75 psig. Each unit will weigh 446 tons.

The stations will have six cooling towers - two for each generating unit. Towers will be of the cross flow, induced draft type, with 10 cells each. They will be 35 feet high, 71 feet wide, 401 feet long, and will have a water flow of 271,000 gallons per minute per unit.

Water supply will be pumped approximately 3 miles to the station from Lake Powell. Consumptive use of up to 34,100 acre feet annually is permitted under the Water Service Agreement with the United States.

(13) Applicant shows in accordance with Section 2851.2-1 (c) (1) of Subpart 2851, Chapter II, Title 43, Code of Federal Regulations, that the transmission line for which the right-of-way is requested will originate at Westwing Substation located in Section 12, Township 4 North, Range 1 West,

Maricopa, Arizona, approximately 18 miles northwest of the center of the City of Phoenix, Arizona. Said right-of-way will extend in a generally Southeasterly direction, a distance of approximately 170 miles to a terminus at the Vail Substation located in Section 4, Township 16 South, Range 15 East, Pima County, Arizona, approximately 12 miles Southeast of the City of Tucson, Arizona.

Said transmission line will consist of guyed towers with conductors arranged in a delta or equilateral triangle configuration. Each of the lines will operate at a nominal phase-to-phase voltage of 525 kilovolts, a maximum phase-to-phase voltage of 550 kilovolts, and a nominal phase-to-ground voltage of approximately 303 kilovolts. Each phase has four conductors which are estimated to have a cross-section area of 636, 000 to 954, 000 circular miles. The three-phase conductors are located at the corners of an equilateral triangle which is approximately 36 feet on a side. Each phase consists of a four-conductor bundle, with the conductors in a horizontal plane and space 15 to 18 inches apart. Corona free spacers will be located at 200 feet intervals to keep the two conductors of each phase from contacting each other.

The towers will be designed in sections so that they can be field assembled. Each single tower structure is supported by four to eight galvanized steel guy cables anchored to the ground. Tower spacing will be typically 1, 080 feet.

The transmission lines will be for applicant's own use in furnishing electric power for its distribution system pursuant to the Franchise issued by the Corporation Commission of the State of Arizona.

# APPLICATION FOR GRANT OF EASEMENT

## RIGHT OF WAY TO CONSTRUCT, MAINTAIN AND OPERATE TWO 345 KV TRANSMISSION LINES OVER PAPAGO INDIAN TRIBAL LAND IN THE STATE OF ARIZONA

TUCSON GAS & ELECTRIC COMPANY, a corporation duly organized and existing under and by virtue of the laws of the State of Arizona, with office and principal place of business at Tucson, Arizona, and authorized to do business in the State of Arizona, hereby makes application for a grant of easement pursuant to the Act of Congress passed February 5, 1948 (62 Stat. 17; 25 U.S.C. 323-328, as amended), and in accordance with the regulations of the Secretary of the Interior, Part 161, of Title 25, Code of Federal Regulations.

(1) The requested grant of easement is for the occupancy and use of certain Papago Indian lands under the jurisdiction of the Bureau of Indian Affairs, located in the State of Arizona, by constructing, maintaining and operating thereon for the main purpose of transmitting electric power, two 345 kv electric transmission lines to be located as shown on the attached maps filed herewith. When the detailed surveys have been completed regarding the requested right of way, maps will be prepared in accordance with the provisions of 25 CFR 161.6, and submitted as a part of this application.

(2) The right of way required is 330 feet in width and extends over lands of the Papago Indian Reservation.

The distances are approximately 37 miles containing approximately 1,470 acres on the Papago Indian Reservation.

(3) Reference is here made to the following documents filed herein:

1. A copy of the Articles of Incorporation of Tucson Gas & Electric Company, Tucson, Arizona, duly certified by the Arizona Corporation Commission;
2. A certified copy of the Resolution of the Corporation authorizing the filing of this application, and also authorizing the signature of the undersigned as Representative of the Corporation for this purpose;
3. Evidence of good faith and financial responsibility as shown by the 1972 Annual Report of Tucson Gas & Electric Company and the 1962-1972 Financial and Statistical Review of the Company.

(4) Tucson Gas & Electric Company hereby expressly agrees to perform those stipulations set out in 25 CFR 161.5, which are attached hereto designated EXHIBIT "A".

(5) A copy of the "Applicant's Environmental Analysis, 345 KV Transmission Line, Westwing Substation (Phoenix, Arizona) to Vail Substation (Tucson, Arizona)" is attached hereto.

(6) The requirements of the National Environmental Policy Act and the directives of the Department of the Interior are in the process of being completed with the Bureau of Land Management, Department of the Interior, being the lead federal agency.

(7) The term requested for said right of way is 50 years with renewal clause, all as provided within the Regulations of the Secretary of the Interior, Part 161, of Title 25, Code of Federal Regulations.

TUCSON GAS & ELECTRIC COMPANY

BY: ____________________
J. Thomas Via, Jr.
Assistant Vice President

Date: September 11, 1973

## Partial Vertebrate List

### A. Mammals

Antelope Jack Rabbit
Black-tailed Jack Rabbit
Desert Cottontail
Rock Squirrel
Harris Antelope Squirrel
Round-tailed Ground Squirrel
Valley Pocket Gopher
Silky Pocket Mouse
Arizona Pocket Mouse
Bailey's Pocket Mouse
Desert Pocket Mouse
Rock Pocket Mouse
Merriam's Kangaroo Rat
Southern Grasshopper Mouse
Western Harvest Mouse
Cactus Mouse
Deer Mouse
Hispid Cotton Rat
White-throated Wood Rat
Coyote
Kit Fox
Gray Fox
Ringtail
Raccoon
Badger
Mountain Lion
Bobcat
Javelina
Desert Mule Deer
Desert Bighorn Sheep
Spotted Bat - may occur but not reported
No prairie dog colonies known; hence no Black-footed Ferret populations.

### B. Birds

Great Blue Heron - found at any season, but in small numbers, wherever there is much open water, nesting in small heronries.

Turkey Vulture - common summer resident, being somewhat more common farther north and west from Tucson.

Black Vulture - Scattered resident along entire proposed corridor.

Sharp-shinned Hawk - Winters commonly within the route area.

Cooper's Hawk - Nests scatteringly along the proposed route.

Red-Tailed Hawk - Common along the proposed route.

Swainson's Hawk - Fairly common summer resident along the line.

Zone Tailed Hawk - Nests rarely along the proposed corridor.

Golden Eagle - Sparingly distributed along the proposed corridor, it is somewhat more common in the winter and is virtually absent in the summer after breeding.

Caracara - Resident in small numbers on the Papago Indian Reservation.

Prairie Falcon - Scarce resident along the proposed corridor with some additional winter in migration.

*Peregrine Falcon - Rare cliff dweller along the route.

Pigeon Hawk - Uncommon winter resident.

Sparrow Hawk - Common winter resident and transient.

Scaled Quail - Common resident of mesquite type along the southernmost portion of route.

Gambel's Quail - Abundant in all areas where mesquite grows.

Sandhill Crane - Uncommon winter resident in irrigated farmland along the proposed route.

Killdeer - Abundant in irrigated areas in winter and near open water yearlong.

Whitewinged Dove - Abundant summer resident, nesting in mesquite-salt cedar trees.

Mourning Dove - Common resident along entire route, nesting almost anywhere from the ground to brush and trees.

Ground Dove - Resident of irrigated cropland along northern portion of the corridor.

Inca Dove - Common resident in and around the Phoenix metropolitan area of south Rainbow Valley.

Roadrunner - Common resident along the entire route.

Barn Owl - fairly common resident along the entire route.

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* Classified as endangered species under 1973 Endangered Species Act

Common Screech Owl - Common resident.

Great Horned Owl - Fairly common resident.

Ferruginous Pygmy Owl - Scarce resident.

Elf Owl - Common summer resident.

Burrowing Owl - Rare in farmland except around Phoenix where it is fairly common.

Long Eared Owl - Scarce winter resident along the entire line.

Nuttall's Poor Will - Winters along the route.

Lesser Nighthawk - Abundant summer resident.

Woodhouse - Found in winter scattered along the route.

Costa's Hummingbird - Common breeding bird along the line.

"Yellow-shafted" Flicker - Uncommon winter resident along the line.

Gilded Flicker - Common resident of the paloverde-saguaro, mesquite and riparian types.

Gila Woodpecker - Common resident.

Ladder-backed Woodpecker (cactus woodpecker) - Common resident.

Scissor tailed Flycatcher - Casual summer visitant - always singly.

Wied's Crested Flycatcher - Common summer resident of saguaro associations.

Ash throated Flycatcher - Occasional winter resident.

Eastern Phoebe - Rare winter visitor.

Black Phoebe - Winters and breeds commonly along the canals along the proposed corridor.

Hammond's Flycatcher - Winters in small numbers along the route.

Vermillion Flycatcher - Common to abundant in mesquite during summer, always near water.

Beardless Flycatcher - Winters along the proposed corridor south of Tucson and east of Aguirre Pass.

Bank Swallow - Fairly common around irrigated fields.

Cliff Swallow - Found in nesting colonies near water. Colonies on cliffs, dams, bridges, culverts, buildings, etc.

Common Raven - Common resident wherever nesting cliffs are available.

White Necked Raven - Winter resident east of Papago Indian Reservation, also breeding in this area.

Verdin - Associated with mesquite along corridor.

House Wren - Winters in better vegetated areas along the proposed corridor.

Cactus Wren - Common resident along the proposed corridor, but more numerous in cholla cactus and open mesquite which is used for nesting.

Bendire's Thrasher - Winters along the proposed route.

Curve-billed Thrasher - Common resident of cholla cactus associations and other dense thorny brush areas along the proposed corridor.

Le Conte's Thrasher - Sparse resident in open creosote bush areas along the corridor.

Crissal Thrasher - Common resident in dense tall brush along rivers and larger washes crossing the proposed corridor.

Blue-gray Gnat Catcher - Common winter resident of river valleys along the route.

Black-tailed Gnatcatcher - Fairly common resident of open brush areas along the corridor.

Golden Crowned Kinglet - Occasional winter visitor in most easterly portion of the corridor in the vicinity of Tucson.

Phainopepla - Common winter resident along the corridor, nesting in brush containing mistletoe.

Loggerhead Shrike - Common summer resident of brushy areas while others migrate in and winter in some areas.

Starling - Breeding resident along the corridor, being more numerous around irrigated farmland.

Arizona Vireo - Common summer resident in dense brush, especially mesquite associations.

Solitary Vireo - Winters in towns and dense mesquite along the corridor.

Lucy's Warbler - Abundant summer resident in dense mesquite along the corridor.

Parula Warbler - Rare fall and winter visitant along the corridor.

Yellow-breasted Chat - Very common summer resident of dense mesquite and arrowweed associations along rivers and at ponds along the corridor.

English Sparrow (house sparrow) - Abundant resident of cities, ranch headquarters and irrigated fields along the route.

Eastern Meadowlark - Fairly common summer resident in irrigated fields along the route.

Western Meadowlark - Common summer resident in irrigated fields along the route.

Scott's Oriole - Winters irregularly along the proposed route.

Brown-headed Cowbird - Winters commonly along the route where there are livestock concentrations.

Red-eyed Cowbird - Common summer resident at irrigated areas along the route.

Cardinal - Common resident of the taller and denser brush along the route.

Pyrrhuloxia - Rather common summer resident in dense brush along the route. Others winter over the same range.

Varied Bunting - Uncommon summer breeding resident in low thorny thickets and foothill canyons along higher portion of corridor.

House Finch - Common winter resident of lower valleys.

Pine Finch - Common winter resident of weedy fields and river valleys along the corridor.

Green Tailed Towhee - Winters fairly commonly in low weedy brush along the route.

Rufous-sided Towhee - Winters fairly commonly in brush canyons and river valleys along the proposed corridor.

Albert's Towhee - Common resident in dense undergrowth of mesquite associations of main rivers along corridor.

Lark Bunting - Abundant winter resident in brushless, weedy, or barren looking parts of the corridor.

Grasshopper Sparrow - Fairly common winter resident in grass-mesquite association east of the Papago Indian Reservation.

Rufous-winged Sparrow - Common resident in grass-thorn brush areas along the corridor.

Black-throated Sparrow - Common summer resident of scattered low brush or cactus vegetated areas.

Brewer's Sparrow - Abundant winter resident outside creosote bush type along corridor.

White-throated Sparrow - Rare winter resident in valley brush and foothill canyons along the route.

Lincoln's Sparrow - Winters in dense brush around irrigated farmland.

## C. Amphibians and Reptiles

### Frogs and Toads

Couch's Spade Foot Toad - Ground dweller - breeds in paloverde, creosote bush and mesquite communities.

Western Spade Foot Toad - Ground dweller. Breeds in all habitats.

Wood House's Toad - Occurring principally along permanent and semipermanent streams; rarely found any great distance from channels or flood plains.

Red-spotted Toad - Rock dweller in rocky canyons and foothills with or without permanent surface water.

Narrow-mouthed Toad - Found in and near summer rain-formed pond and pools on Papago Reservation east to Three Points.

Bullfrog - Permanent ponds and water.

Leopard frog - Permanent and semipermanent surface waters along the route.

Turtles

Desert Tortoise - Strictly terrestrial and a vegetarian; found everywhere in desert along the routes but not abundant anywhere. Found predominately in rocky foothills where it digs burrows into hillsides and under rocks, often taking advantage of initial excavations by other animals, particularly the rock squirrel and Harris antelope squirrel.

Lizards

Gila Monster - Found principally in undulating rocky foothill terrain, in rocky gravelly bajadas, and in rocky canyons. It is found much less frequently or is absent on open desert plains. Shelter is taken in rodent burrows, wood rat nests, dense thickets and under rocks.

Banded Gecko - Common in sandy and gravelly soils and rocky terrain with rodent burrows and rock crevices used for shelter.

Desert Iguana - Common to abundant in valleys and plains where creosote bushes with rodent burrows under them are characteristically present.

Collared Lizard - Found throughout. Rocks, large or small, single or numerous, are used for immediate shelter. May occur in open flats as well as rocky hills and mountain slopes.

Leopard Lizard - A swift ground dweller and lizard eater that occurs everywhere but is abundant nowhere.

Chuckwalla - Northwest of Silver Bell Mountains along the proposed corridor. Rocks and rocky crevices are used for night and day shelter, sunning stations and hibernation. Scattered rocks are used for temporary shelter during diurnal foraging away from home crevices.

Zebra Tailed Lizard - Found along entire route but more abundant in washes and arroyos; also less abundant on rock and gravel surfaces than across most arid flat terrain.

Desert Spring Lizard - Found everywhere along the proposed route. Ground and rock habitat.

Long-tailed Brush Lizard - Found along the route west and north of Avra Valley. A climbing species on desert trees and shrubs that is rarely seen on the ground or on rocks.

Tree Lizard - A climbing species in trees and shrubs along the entire route; also found climbing and sunning on rocks and cliffs. Rarely seen long on the ground.

Side-blotched Lizard - Found along entire route; shelters under shrubs, in rodent holes, in wood rat nests, and under rocks.

Desert Horned Lizard - Found north and west of Avra Valley along the proposed route. Found in all habitats but is usually in the vicinity of considerable shrub cover.

Western Whiptail - Found along the entire route.

Snakes

Western Blind Snake (western worm snake) - Subterranean burrower in all types of soil.

Checkered Garter Snake - Along entire route; may be found great distances from water. Rodent burrows are used for shelter; activity in the desert is generally at night.

Sonora Whipsnake - Found primarily in the paloverde-saguaro type along the route. Shelter and foraging on the ground, in shrubs and trees.

Red Racer (coachwhip, whipsnake or black racer) - Found along entire route in all types of habitat. Shelters in rodent burrows, wood rat nests, and under and among rocks.

Desert Patch Nosed Snake - Found along the entire route; ground-dwelling, fast moving, preferring open flat sunny areas.

Bullsnake (gopher snake) - Found in all habitats along the route.

Saddle Leaf-Nosed Snake - Found within the Papago Reservation and east. Is a burrower in all types of soils, but usually occurs in the rocky-gravelly foothills of the paloverde-saguaro type and is absent or far less frequent in basin area (creosote bush).

Spotted Leaf-Nosed Snake - Burrower in sandy soils of creosote bush type along the route. Less frequent in paloverde-saguaro.

Banded Burrowing Snake - Burrower in all vegetative types.

Southwestern Lyre Snake - Found along entire route. Is a strong climber among rocks and vegetation, primarily in rocky canyons and hillsides; rarely encountered in open, rockless or treeless situations.

Night Snake - Found along entire route using rodent burrows, tree trunks or rock crevices for shelter.

Arizona Coral Snake - Ground burrower, inoffensive, most abundant in paloverde-saguaro type.

Western Diamond Back Rattlesnake - Found in all habitats along the entire route.

Black-tailed Rattlesnake - Found sparingly along the entire route in rocky areas.

Mohave Rattlesnake - Found along entire route, principally in open non-rocky flat areas (creosote bush type). Shelter primarily rodent burrows and in aboveground rat nests.

Tiger Rattlesnake - Strict rock dweller in rocky canyons and hillsides (paloverde-saguaro) along the route.

Sidewinder (horned rattlesnake) - Found along the route north and west of a line south of the Tucson mountains. Occurs in all habitats with equal success.

# PROPOSED

## Easement for Right-of-Way for Electrical Power Transmission Line Across National Resource Lands

Pursuant to the Act of March 14, 1911, as amended, 43 USC 961 (1970), and subject to valid existing rights, there is hereby granted to the Tucson Gas & Electric Company, hereinafter referred to as Grantee, an easement for a right-of-way over, across, and upon the public lands and reserved lands of the United States within the State of Arizona for an electrical power transmission line.

The easement hereby granted is for those portions of a 345 kv Electrical Power Transmission Line extending from the El Sol Substation to the Vail Substation, which are situated in the State of Arizona. Use of said easement for additional transmission lines or for other purpose is prohibited unless separately approved by the Department of the Interior. The route of the line is delineated on maps comprising Exhibit A of Grantee's application for an easement dated August 25, 1972, which was filed with the Bureau of Land Management on August 28, 1972, in file No. A-7274. The term of this grant is fifty (50) years from the date hereof. The width of the right-of-way hereby granted is 220 feet, being to the extent of 110 feet on each side of the centerline of the Line.

An annual charge for the use and occupancy of public lands under the authority of this right-of-way permit will be determined by the Authorized Officer in accordance with the provisions of 43 CFR 2802.1-7.

The annual charge shall be paid by Grantee to the Authorized Officer. Written notice of the amount of the annual charge will be given annually in advance by the Authorized Officer to Grantee.

This grant is made upon the express condition that each of the terms and conditions hereof, which are appended hereto and incorporated herein, shall be fully complied with by Grantee, and by accepting this grant, Grantee agrees and covenants to fully comply with each said terms and conditions, and to make timely payment of annual charges. Failure of Grantee to comply with said terms and conditions shall be cause for cancellation of this grant.

UNITED STATES OF AMERICA

by ____________________________
State Director for Arizona
Bureau of Land Management
Phoenix, Arizona

County of____________________)

State of____________________)

Before me,______________________________, a Notary Public in and for the County of______________________, State of__________________, on this_____ day of___________________1972, personally appeared_____________________, the State Director for____________________, Bureau of Land Management, (City), State, to me known to be the identical person who executed the foregoing instrument and acknowledge to me that he executed the same as a free and voluntary act and deed for the uses and purposes set forth therein.

________________________________
Notary Public

My commission expires_____________________

Accepted for the (grantee)

________________________________
(Name and Title)

(add Notary certificate)

## Part I. Right-of-Way Construction and Maintenance - Terms and Conditions

### A. Definitions:

As used in this Part I of these terms and conditions, the following terms have the following meanings:

1. "Authorized Officer" means the Arizona State Director of the Bureau of Land Management or his delegate, acting on behalf of the Department of the Interior for this project. The term is synonymous with "Superintendent in Charge" referred to in 43 CFR, Part 2800, and with "Contracting Officer or Contracting Officer's representative" as it applies to Bureau of Indian Affairs functions.

2. "Line" means the 345 kv Power Transmission Line which is the subject of this right-of-way grant.

3. "Grantee" means the Tucson Gas & Electric Company and any other company which at any time owns or operates the Line.

### B. Bonding Requirements

1. Within Thirty (30) days after issuance of the 345 kv electrical power transmission line right-of-way easement grant necessary for construction of the Line but before construction begins , Grantee shall furnish the United States a surety bond or other security (hereinafter called "Bond") of such type and on such terms and conditions as are acceptable to the Secretary of the Interior, in the principal amount of $100,000 ------------------ . Said Bond shall at all times be maintained in force and effect in the full principal amount until construction of the Line is completed and until the Bond is released in writing by the Secretary of the Interior. These bonding provisions cover the construction on Indian lands as well as national resource lands.

   Said Bond shall have the purpose of: (1) ensuring the performance by Grantee of each and every obligation of Grantee under the terms and conditions of this grant and any permit issued to Grantee by the United States in connection with the Line; (2) providing for immediate payment to the United States of any cost or obligation incurred by the United States in performing any said obligation of Grantee which in the judgment of the Authorized Officer, Grantee has not performed satisfactorily; and (3) insuring the payment, within the amount of said Bond, of any final judgment.

These bonding requirements are in addition to, and are not intended to affect all other requirements of law, nor are they intended to limit in any way Grantee's liability under any provision of law.

C. Authorized Officer Responsibilities

1. The Authorized Officer may at any time inspect the onsite construction and maintenance activities of Grantee in connection with the Line. Official representatives of State and other Federal agencies may also inspect such activities if necessary to the performance of official duties which relate to the Line. The Authorized Officer is responsible to take any appropriate action on request or contacts made by representatives of the Papágo Tribe, pursuant to the construction of the Line over Indian lands.
2. For purposes of information and review, the Authorized Officer may call upon Grantee at any time to furnish any or all data related to preconstruction, construction and maintenance activities undertaken in connection with the Line.
3. Except where the approval of the Authorized Officer is required before Grantee may commence a particular operation, neither the United States nor any of its agents or employees agrees, or is in any way obligated, to examine or review any plan, design, specification, or other document which may be filed with the Authorized Officer by Grantee pursuant to these terms and conditions.
4. The absence of any comment by the Authorized Officer or any other employee of the United States with respect to any plan, design, specification, or other document which may be filed by Grantee with the Authorized Officer shall not be deemed to represent in any way whatever any assent to, approval of, or concurrence in such plan, design, specification, or other document or of any action proposed therein.

5. The Authorized Officer may not delegate his authority to:

   (a) Modify the Line

   (b) Suspend construction or maintenance activity.

   (c) Approve construction or maintenance activities which do not conform to descriptive and technical data heretofore submitted to the Bureau of Land Management.

   (d) Revise or amend these terms or conditions where unforeseen conditions arise.

D. Liaison

Grantee shall designate a representative for field operations who shall be the sole field representative of Grantee and Grantee's contractors in dealings with the Authorized Officer; said representative shall be empowered on behalf of Grantee and Grantee's contractors to communicate with the Authorized Officer and to receive and comply with all communications and decisions of the Authorized Officer.

Grantee shall keep the Authorized Officer informed of any change in the name of Grantee's contact representative for field operations during construction of the Line and related facilities.

Grantee shall keep the Authorized Officer informed of its principal place of business and of the names and addresses of the principal officers at all times during the term of this grant.

## E. Preconstruction Conference

1. Before construction begins, the Grantee's representative will establish a suitable date with the Authorized Officer for a preconstruction conference. The Authorized Officer will ensure that members and/or representatives of the Papago Tribe and officials from the BIA are requested to attend the preconstruction conference.

2. At the conference the Grantee will present a complete plan of operation, including but not limited to:

   a. Construction sequences, methods and equipment to be used in all phases.

   b. Tentative routes of temporary and permanent access roads.

   c. Location and extent of surface disturbing activities connected with each construction phase and restoration plans therefor.

   The Authorized Officer will make a timely response pointing out modifications needed to protect resource values and will furnish Grantee the details of soil conservation and vegetative restoration techniques to be used.

## F. Modification and Suspension

1. During the preconstruction and construction periods, the Authorized Officer may require Grantee to make such modification of the Line as he deems necessary to protect or maintain stability of geologic materials, fish and wildlife habitats, the environment, and the public interest, without liability or expense to the United States.

2. The Authorized Officer at any time may issue a written decision suspending any construction or maintenance activity of Grantee in connection with the Line which, in the judgment of the Authorized Officer, immediately threatens serious or irreparable harm to life (including wildlife and aquatic life), property, or the environment. In the event the Authorized Officer determines that Grantee has failed or refused to comply with any provision of this grant or any permit issued by the Department of the Interior in connection with the Line, and after due notice including a reasonable time to rectify the problem he may issue a written decision suspending any or all of Grantee's construction activities under said grant and permits. Grantee shall not resume such suspended activities until given written authorization to do so by the Authorized Officer. Any dispute arising under this grant shall be decided by the Authorized Officer.

3. Any decision or approvals of the Authorized Officer which are required herein to be in writing may in emergencies be issued orally, with subsequent confirmation in writing as soon thereafter as possible.

G. Appeals

Decisions of the Authorized Officer shall be effective upon issuance, unless they specifically provide otherwise. Grantee may appeal any such decision directly to the Secretary of the Interior. The regulations of the Department of the Interior relating to hearings and appeals, 43 CFR Part 4, shall not be applicable to such an appeal. If an appeal is to be taken, notice of appeal shall be filed with the Secretary of the Interior within thirty (30) days after issuance of the decision being appealed. The notice shall set forth with particularity the decision being appealed, the facts of the matter and the applicable law, together with such written showing and argument on the facts and law as Grantee may wish to present to justify modification or reversal of the decision. All statements of fact shall be under oath. Unless the Secretary of the Interior orders otherwise for good cause shown, the decision of the Authorized Officer shall not be suspended during the pendency of the appeal, but shall continue in full force and effect.

### H. General Requirements

1. Grantee shall construct and maintain the Line in conformity with the descriptive and technical data accompanying the Grantee's application for the Line. Construction or maintenance activities which are not in substantial accord with such data may not be initiated without the prior written approval of the Authorized Officer. Approval of substantial variances will not be given unless the need therefor is fully justified by Grantee.

2. If at any time hereafter, Grantee wishes to reconstruct, remodel, or relocate any portion of the right-of-way hereby granted, or any of the improvements thereon, the prior written approval of the Authorized Officer must be obtained. No such approval will be given unless the request is fully justified by Grantee and is authorized by law. Where necessary, Grantee shall make application under appropriate regulations.

3. With regard to the location, construction and maintenance of the Line: (a) Grantee shall ensure full compliance with the terms and conditions of this grant by its agents, employees and contractors (including sub-contractors of any tier), and the employees of each of them; (b) Unless clearly inapplicable, the requirements and prohibitions imposed upon Grantee by these terms and conditions are also imposed upon Grantee's agents, employees, contractors, and sub-contractors, and the employees of each of them; (c) Failure or refusal of Grantee's agents, employees, contractors, sub-contractors, or their employees to comply with these terms and conditions shall be deemed to be the failure or refusal of Grantee; (d) Grantee shall require its agents, contractors or sub-contractors to include these terms and conditions in all contracts and sub-contracts which are entered into by any of them together with a provision that the other contracting party, together with its agents, employees, contractors and sub-contractors, and the employees of each of them shall likewise be bound to comply with these terms and conditons.

4. Unforeseen conditions arising during the term of this grant may make it necessary to revise or amend these terms and conditions to protect the environment and the public interest. In that event, Grantee and the Authorized Officer shall agree as to what revisions or amendments shall be made. If they are unable to agree, the Secretary of the Interior shall have final authority to determine the matter.

5. Grantee shall make separate application, under applicable statutes and regulations, for additional authorizations to use or occupy Federal or Indian lands in connection with the Line.

6. Grantee agrees and consents to be bound by the terms and conditions set forth at 43 CFR 2801.1-5 and 2851.1-1.

7. Grantee acknowledges and agrees that the grant of this right-of-way shall be subject to the express condition that the exercise thereof will not unduly interfere with the management, administration, or disposal by the United States or the Papago Tribe of the lands affected thereby, and that he agrees and consents to the occupancy and use by the United States or the Papago Tribe, their grantees, permittees, or lessees of any part of the right-of-way not actually occupied or required by the project, or the full and safe utilization thereof, for necessary operations incident to such management, administration or disposal.

8. Grantee shall pay the United States the full value for all damage to the lands or other property of the United States or the Papago Tribe caused by Grantee or by its employees, contractors, or employees of the contractors, and shall indemnify the United States and the Papago Tribe against any liability for damage to life, person or property arising from the occupancy or use of the lands under the right-of-way. Provided, however, that if Grantee has no legal power to assume such a liability with respect to damage caused by it to lands or property, Grantee in lieu thereof agrees to repair all such damage.

9. (a) Grantee shall abate any condition existing with respect to the Line that causes serious and irreparable harm or damage to any person or property. (b) Any property or resource harmed or damaged by Grantee in connection with

the Line shall be reconstructed, repaired and rehabilitated by Grantee to the written satisfaction of the Authorized Officer.

10. As provided by 43 CFR 2851.2-1(c)(6)(ii), Grantee shall locate, design and construct the Line and related facilities, including access roads, consistent with the criteria jointly established by the Secretary of the Interior and the Secretary of Agriculture and set forth in the publication entitled "Environmental Criteria for Electric Transmission Systems." Representatives of Grantee and Grantee's contractors shall confer with the Authorized Officer at such times before, during and after construction of the Line as the Authorized Officer may request for the purpose of ensuring compliance by Grantee with the terms of this subsection.

11. Grantee shall provide for the protection and enhancement of aesthetic values in the planning, construction and maintenance of the Line. Tower and support facilities will have dull or non-reflective finishes that harmonize with their natural setting or are otherwise appropriate in areas exposed to frequent public view. Non-reflective conductor cable will be used, The Authorized Officer may require any additional reasonable measures he deems necessary to protect the aesthetic values in critical areas.

12. Prior to construction, Grantee shall make a survey and inventory of archaeological, paleonthological, and historical sites within the area to be occupied by the right-of-way and the access roads. The results of this survey will be provided to the Authorized Officer. The Authorized Officer

may require Grantee to relocate the proposed transmission line facilities in order to avoid destruction of archeological, paleontological, or historic values or to delay construction until salvage operations are completed. All costs of inventory, survey and salvage operations will be borne by Grantee. All salvage shall remain the property of the United States, except that located on Indian land. Salvage material located on Indian lands shall remain the property of the Papago Tribe.

13. The right-of-way herein granted shall be subject to the express covenant that it will be modified, adapted, or discontinued if found by the Secretary to be necessary, without liability or expense to the United States, so as not to conflict with the use and occupancy of the land for any authorized works which may be hereafter constructed thereon under the authority of the United States, except that the Papago Tribal Utility Authority has agreed to relocate at no expense to the Tucson Gas & Electric Company any structures on the reservation that may fall on potentially irrigable lands and that would interfere with Central Arizona Project construction.

14. Before construction on any section of transmission line may commence, there shall be written agreement between the Authorized Officer and Grantee regarding the location of tower sites, access roads and related facilities, and the construction and restoration methods necessary to meet the objectives and requirements of this grant. During construction there will be periodic inspections by the Authorized Officer to ensure compliance. A post-construction inspection and conference will be held between Grantee and the Authorized Officer to assure that construction and restoration have been completed in accordance with this grant and, if not, to determine how inconsistencies shall be rectified.

15. Grantee shall construct the Line so that it will conform to all applicable Federal Regulations regarding aircraft safety. The Authorized Officer may also require appropriate additional aircraft marking and devices at various locations as he deems necessary.

16. In all its operations under this grant, Grantee shall comply with all applicable Federal, State and local laws and regulations concerning the use of poisonous substances, including but not limited to, insecticides, herbicides, fungicides, and rodenticides. Grantee shall prepare a written plan of use of such substances which must be approved by the Authorized Officer before such substances may be used by Grantee on or near the right-of-way. The plan shall state the type and quantity of material to be used, the pest to be controlled, the method of application and such other information as the Authorized Officer may require. All use of such substances on or near the right-of-way shall be in accordance with the approved plan. If the use of a poison is prohibited by the Secretary of the Interior, it shall not be used. If use of a poison is limited by the Secretary of the Interior, it shall be used only in accordance with that limitation.

17. Grantee shall remove or dispose of all waste caused by its activities in a manner satisfactory to the Authorized Officer. The term "waste" as used herein means all discarded matter, including but not limited to, human waste, trash, garbage, refuse, oil drums, petroleum products, ashes, and equipment. Construction campsites will be maintained in a sanitary condition at all times and garbage and refuse at these sites will be disposed of promptly.

18. Within ninety (90) days of completion of construction of the line, Grantee shall submit a maintenance plan to the Authorized Officer for approval. The plan shall specify the types and frequency of reoccurring activities to be conducted by Grantee within and along the right-of-way. Either party may request that the maintenance plan be updated to meet changing conditions. Amendments and revisions of the maintenance plan shall be approved by the Authorized Officer.

19. Within ninety (90) days after conclusion of construction operations, all construction materials and related litter and debris, including vegetative cover accumulated through land clearing, will be disposed of in accordance with a plan approved by the Authorized Officer.

20. Proof of construction of the Line must be filed within five (5) years of the date of this grant.

21. If during construction, there are deviations from the location of facilities as shown on the original maps, Grantee shall file relinquishment of the unused portions of the right-of-way. The relinquishment shall be accompanied by a map of the amended location of the right-of-way for the project as actually constructed, in accordance with 43 CFR 2802.2-2.

22. Upon revocation or relinquishment of the right-of-way, Grantee shall remove all equipment and improvements. Grantee shall restore the land, so far as it is reasonably possible to do so, to its original condition to the satisfaction of the Authorized Officer.

23. Grantee shall comply with applicable Federal and State laws and regulations issued thereunder, existing or hereafter enacted or promulgated, affecting in any manner construction, operation, maintenance or dismantling of the Line.

24. In the construction, operation, and maintenance of the Line, Grantee shall not discriminate against any employee or applicant for employment because of race, creed, color, sex, or national origin and shall require an identical provision to be included in all subcontracts.

25. Grantee shall employ Indians, giving priority to members of the Papago Tribe, in all positions for which they are qualified and available, and shall pay the prevailing wage rates for similar services in the area. Grantee shall do everything practicable to employ qualified Indians, giving priority to members of the Papago Tribe, and their equipment in the hauling of all materials under this project insofar as Grantee does not use its own equipment for that purpose. Grantee agrees to make special efforts to work Indians, giving priority to members of the Papago Tribe, into skilled, technical and other high jobs in connection with Grantee's operations under this lease.

## I. Construction Requirements

1. Grantee shall submit a timetable of construction for review of the Authorized Officer fifteen (15) days in advance of construction.

2. If grantee or its contractors require materials for construction purposes from the public lands, application shall be made under applicable regulations for such materials. Permittee shall submit a mining plan and effect reclamation of the land in accordance with 43 CFR, Part 23. No material may be removed by Grantee or its contractors without the written approval of the Authorized Officer. Insofar as possible, use of existing material sites will be authorized in preference to new sites.

3. Grantee shall promptly notify the Authorized Officer of the amount of merchantable vegetation, if any, which will be cut, removed, or destroyed in the construction and maintenance of the project and shall pay the United States through the Authorized Officer, in advance of construction, such sum of money as the Authorized Officer may determine to be the full value of the vegetation to be so cut, removed, or destroyed.

4. Grantee shall conduct all construction and maintenance activities in a manner that will minimize disturbance to vegetation, drainage channels, and streambanks. Construction methods shall be designed to prevent degradation of delicate soil conditions in areas where such degradation would result in detrimental erosion or subsidence. Grantee shall take any other

such soil and resource conservation and protection measures on the land covered by the right-of-way as the Authorized Officer determines are necessary.

5. Clearing of the right-of-way shall be limited to the extent and manner directed by the Authorized Officer. Grantee shall dispose of all vegetative and other material cut, up-rooted, or otherwise accumulated during the construction and maintenance of the Line in such manner as the Authorized Officer may specify to decrease the fire hazard.

6. All clearing shall be done with hand tools, except where done for road or tower sites, or as otherwise approved by the Authorized Officer. Scalping of top soil and removal of low growing vegetation will not be allowed outside the road area and tower sites.

7. Public land areas used for temporary access roads, campsites, equipment storage, and other construction activities shall be restored by Grantee to their natural state insofar as practicable and in accordance with a restoration plan approved by the Authorized Officer.

Grantee shall provide at his expense for prompt scarification and reseeding of disturbed areas in Pima County which, in the opinion of the Authorized Officer, lend themselves to successful seeding. Forage and game species of seed shall be provided by the grantee and applied in accordance with specific instructions and techniques prescribed by the Authorized Officer .

Whenever revegetation is required under the restoration plan, Grantee shall file a report with the Authorized Officer when such planting is completed. The report shall contain information regarding the location of the area; the type of planting or seeding, including mixtures and amounts; the date of planting; and other relevant information as may be required by the Authorized Officer.

Inspection and evaluation of restorative measures taken will be made by the Authorized Officer as soon as it is possible to determine if a satisfactory growth has been established. In no instance shall this vegetative cover check be made until after completion of the first growing season. If needed, a plan for reseeding shall be instigated by the Authorized Officer.

8. Grantee shall take such soil and resource conservation and protection measures, including weed control, on the land within the right-of-way as the Authorized Officer may require.

9. Grantee shall conduct all construction, operation and maintenance activities in a manner that will avoid or minimize degradation of air, land, and water quality. Toxic material shall not be released in any lake or water drainage. All construction work and subsequent use of the right-of-way must be consistent with applicable Federal, State and local standards relating to safety, water quality and public health. Unless otherwise approved in writing by the Authorized Officer, dikes or cofferdams shall be installed to separate concrete work areas from lakes or streams during construction. Mobile ground equipment shall be kept within the right-of-way and out of the waters of lakes, streams, or rivers except as permitted by the Authorized Officer.

10. Grantee shall take such measures as are necessary to assure unrestricted passage and movement of fish and wildlife. No artificial structure or stream channel change that causes a permanent blockage to movement of fish shall be erected or constructed. Grantee shall take all necessary precautions to protect fish and wildlife as determined by the Authorized Officer. By advance written notice from the Authorized Officer, key fish and wildlife areas may be closed to construction activities for specified periods of time to protect designated fish and wildlife species.

11. Grantee shall do everything reasonably within its power, both independently and on request of any duly authorized representative of the United States, to prevent and suppress fires on or near the lands to be occupied under the right-of-way, including making available such construction and maintenance forces as may be reasonably obtainable for the suppression of such fires.

12. Grantee shall build and repair such roads, fences, and trails as may be destroyed or injured by construction work and shall build and maintain necessary and suitable crossings for all roads and trails that intersect the works constructed, maintained, or operated under this grant.

J. Roads and Access Requirements

1. Grantee shall permit free and unrestricted public access to and upon the right-of-way for all lawful and proper purposes, except in areas designated as restricted by Grantee with the consent of the Authorized Officer in order to protect the public safety or facilities constructed on the right-of-way.

2. During construction Grantee shall regulate public access and vehicular traffic as required to facilitate construction operations and to protect the public, wildlife, and livestock from hazards associated with the project. For this purpose, Grantee shall provide warnings, flagmen, barricades, and other safety measures.

3. Grantee will be responsible for providing and installing caution and regulatory signs that are necessary for the safety of users of access roads.

4. Grantee may construct and maintain a permanent access system which may be interconnected with existing permanent roads, along the right-of-way to facilitate construction and maintenance of the line. The Authorized Officer and Grantee shall cooperate in selecting the location of such permanent access road system. The Authorized Officer must approve the location of the roads before construction may begin, and may designate areas where construction of permanent roads is prohibited. In locating the permanent access roads, consideration will be given to topography, soil, and watershed conditions, vegetative cover, existing roads, other land uses, and historical, archeological and paleontological values.

5. Design standards for any permanent access roads authorized by the Bureaus shall be approved by the Authorized Officer and will follow Bureau of Land Management standards in Bureau of Land Management Manual 9110. A normal standard road will be required with maximum width of 14 feet, except at turnouts which will be required every 1000 feet. Grades shall not exceed eight percent. In order that the roads may be used without damage during adverse weather conditions, their surface shall consist of pit-run 3-inch minus gravel to a depth which shall be determined by the Authorized Officer, but not to exceed a depth of 6 inches. Road maintenance shall be performed as directed by the Authorized Officer.

6. Location of temporary access roads along the line necessary for construction shall be subject to approval of the Authorized Officer. These roads shall be installed in a manner that causes minimum surface disturbance and removal of native vegetation. At the conclusion of construction, temporary access roads will be obliterated and the land restored in accordance with the restoration plan provided by the Authorized Officer.

7. Grantees shall survey and clearly mark the exterior limits of the right-of-way. All activities directly or indirectly associated with the construction or maintenance of this electric transmission line must be conducted within the limits of the right-of-way.

K. Cost Recovery

Upon demand of the Authorized Officer, the holder of the right-of-way shall pay to the United States such sums, pending approval of the proposed regulations published in the Federal Register on September 3, 1974, pages 31906 and 31907, as the Authorized Officer shall determine to be required to reimburse the United States for all administrative and other costs incurred directly or indirectly by the United States in monitoring the construction, operation, maintenance, and termination of any electric transmission line covered by this grant.

OF DIRECTORS

l Wingfield, Chairman
Smith, Vice-Chairman
Lopez, Secretary-Treasurer
Smith, Asst. Secretary-Treasurer
Jr
T. McGue
Francisco, Jr.

Johnn
G

THE PAPAGO TRIBAL UTILITY AUTHORITY
P. O. Box 50152, Tucson, Ariz. 85703
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September 4, 1973

Mr. O. E. Whelan, Acting Asst. Area Director
Bureau of Indian Affairs
Phoenix Area Office
P. O. Box 7007
Phoenix, Arizona 85011

Re: Real Prop. Mgmt.
300.1 -- Papago
Your letter Sept. 27, 1973

Dear Mr. Whelan:

We have received the suggestions concerning the "stipulations" in the BLM impact statement referred to in your letter.

PTUA on behalf of the Papago Council agrees with all the stipulations except: Page two, 5th Paragraph, should read:

> Page 198: Paragraph 13 -- This is in conflict with the commitment made by the Papago Tribal Utility Authority to relocate at no expense to the Tucson Gas & Electric Company, any structure on the reservation that may fall on potentially irrigable lands and that would interfere with Central Arizona Project construction.

Of course our agreement is contingent upon the Papago Council approval of the granting of the easement. Should they disapprove the granting of the easement, none of the stipulations would be germane to the statement.

For your information, the Tribal Council will be asked to approve, disapprove or ammend the TG&E proposal the 16th of this month.

Sincerely yours,

Johnnie R. Raley

Johnnie R. Raley
General Manager

Appendix 7

## GLOSSARY

Authorized Officer includes the authorized representatives of the Papago Tribe and the Bureaus of Indian Affairs and Land Management.

Circular mil: The cross-sectional area of a circle with a radius of 1 mil (1/1000 of an inch).

Conductor: The wire utilized in electrical circuits to carry current.

2-Conductor bundles: The common practice of using two wires properly spaced instead of one wire, to reduce electromagnetic effects.

Corona: The physical phenomena of exciting the molecules of air (or any gas) surrounding a high voltage conductor. At higher voltage there is an actual spray of electrons into the atmosphere.

Double circuit: Two separate 3-wire power circuits.

kv (kilovolt): The term for thousand volts.

kwh (kilowatt-hour): The term for thousand-watt-hours (electrical energy).

Lightning arrester(s): A device installed on all power systems to protect equipment from damaging currents resulting from lightning strike.

Load: The customer's (single or combined) power demand upon a system or circuit at a specific period of time.

Microwave repeater: A small radio-amplifying station installed at various distances to compensate for the curvature of the earth when transmitting essential information by wireless communication.

Mw (megawatt): One million watts

NESC: The abbreviation of the National Electrical Safety Code.

Phase: The time sequence of service from a multiphase electrical circuit.

Phase to ground: The difference in electrical potential between an energized conductor of a multiphase power system and the earth.

Phase-to-phase: The difference in electrical potential between any two energized conductors in a multiphase power system.

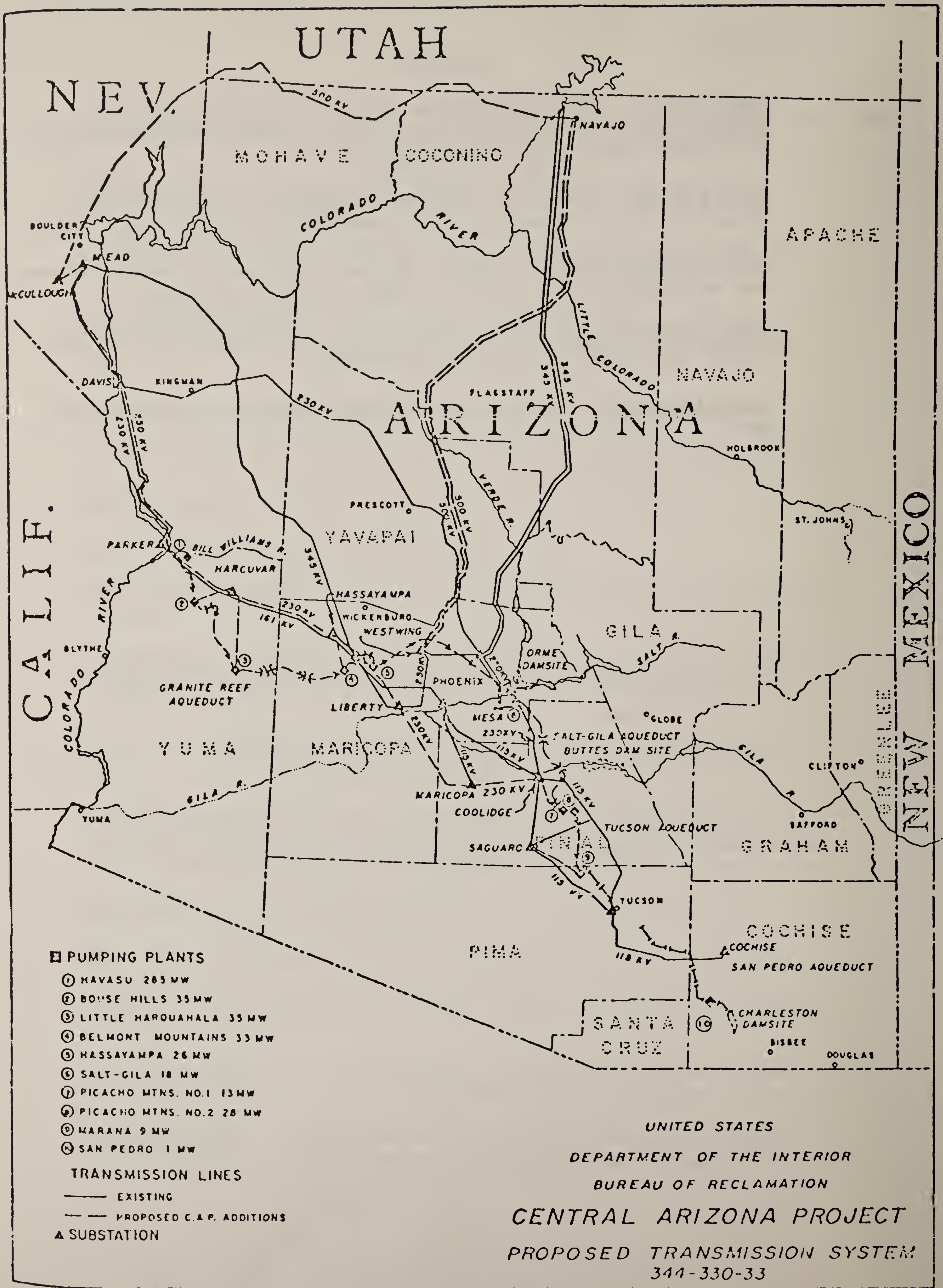
Power Factor: The relationship of true power (kv or Mw) to apparent power in an electrical circuit. It is usually expressed in percent. (See unity power factor.)

Shield Wires: Conductors erected along the top of towers and poles to protect insulators and conductors from lightning damage.

345 kv Phase-to-phase: Refers to the electrical potential between any two conductors in a 345 kv power circuit. (See kv.)

Unity Power factor: The condition when the voltage and current are in the same time sequence (in phase).

Wheeling power: The transfer of power through a system without use.



UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
CENTRAL ARIZONA PROJECT
PROPOSED TRANSMISSION SYSTEM
344-330-33

# TECHNICAL DESCRIPTION OF THE DELIVERY SYSTEM AND ELECTRICAL TRANSMISSION EQUIPMENT

The transmission system is designed to operate at a nominal voltage of 345 kv phase-to-phase, a maximum voltage of 362 kv phase-to-phase, and a nominal voltage of approximately 200 kv phase-to-ground. Each line is designed to carry 168 Mw of baseload power continuously with an emergency capability of 400 Mw. The initial line will carry 56 Mw. As the second and third units of the Navajo Generating Station are put into service, the initial line will carry 112 Mw and 168 Mw, respectively.

Transformers at the South (Tucson) and Vail Substations will reduce the voltage to 138 kv, and also to 46 kv at South Substation, for use in the Tucson area distribution system. The Vail Substation is also the terminus of a 345 kv line from the San Juan Plant in New Mexico. Shunt reactors are planned for both the Westwing and South Substations. Shunt reactors limit the voltage rise along the line, thereby maintaining good voltage regulation. Lightning arrestors and switchgear are planned for the substations for protection and line isolation as necessary. At present no plans exist to tap power from the line between the El Sol and South Substations.

Between the El Sol and Vail Substations, the single-circuit guyed-delta type tower will be used (Figure 1). Typical towers are 105 feet from ground level to the highest point where the overhead ground wire is attached. A minimum conductor height of 34 feet will be maintained under operating conditions to provide safe clearances from the energized conductors in the air to persons on the ground. Where terrain dictates, or where conductors cross highways, railroads, telephone lines or other power lines, additional sections will be added to the tower base to maintain minimum clearances as specified in the National Electrical Safety Code (NESC). This will permit maximum land use under the powerline with safety.

The single-circuit guyed-delta towers are designed in sections for easy field assembly. One section will be a vertical column, typically 80 feet high, that is the main support body of the tower. The superstructure, an additional 25 feet high, will support insulators, phase conductors, and overhead shield wires. With these sections preassembled, towers can be erected with conventional booms, or with helicopters where ecologically desirable. By having the towers designed with many interchangeable pieces and sections, construction time and personnel required for field assembly will be minimized.

Tower foundations will be one of two types, depending upon local soil conditions. One type is a concrete tapered base, either poured in place or precast at the option of the contractor, that fits into a hole 3 to 4 feet in diameter and 8 to 12 feet deep. The other type is a steel grillage, 4 feet by 4 feet, or 5 feet by 5 feet, buried beneath the surface of the earth. Total concrete at each tower may vary from less than 4 cubic yards to nearly 30 cubic yards.

Each tower structure will be supported by four galvanized steel guy cables that will be attached to anchors. Two types of anchors are planned, with soil conditions determining the type to be used at each anchor location. One type is a precast steel reinforced concrete anchor 18 inches in diameter that fits in a hole in the ground about 14 to 16 feet deep. A second type is an all steel shaft 2 inches in diameter containing multiple helixes 10 inches in diameter that will be twisted into the ground. The four guys will form a rectangle at ground level approximately 100 feet on a side, depending on actual tower height, and will be attached to the tower typically 80 feet above ground level.

The conductors and hardware used will be the same for the entire line. Each phase of the 3-phase line will consist of a 2-conductor bundle, with the conductors in a horizontal plane spaced 18 inches apart. Each conductor is 1.18 inches in diameter, consisting of 954,000 circular mils ACSR (aluminum conductor, steel reinforced) cable. In this type of conductor, the load current is carried by the aluminum strands that are spiralled about a core of steel strands. The steel provides mechanical strength to support the aluminum strands and additional ice and wind loading. Under conditions of no external ice or wind loading, the conductor is stressed to 16 percent of its ultimate strength at 60° F. Under maximum wind and ice stress conditions, the conductor mechanical loading will not exceed 50 percent of its ultimate strength. TG&E has selected conductors with a non-specular (diffuse) finish. The non-specular finish tends to blend in with the surrounding area.

Corona-free spacers will be installed at 200-foot intervals to keep the conductors of each phase from contacting each other. There will be some type of corona-free protectors at the point where the insulator clamp is fastened to the conductors, although commitments have not been made on the type. These protectors will increase the safety and reliability of the line by minimizing the remote possibility of conductor damage due to flashover of the insulator string, preventing mechanical fatigue of the conductor strands during conductor aeolian (wind) vibration and reinforcing the conductor mechanically at the support point so that it does not bend sharply. All hardware will be supplied as parts of the insulator assemblies in a coordinated package.

Conductor bundles for the line are arranged in the configuration of a triangle with a base dimension of 30 feet and a height of

21 feet 2 inches (a delta configuration). The near symmetry for conductors in the line means that conductors do not need to be transposed. Transposing the conductors consists of changing the relative positions that each conductor occupies with respect to the other conductors to negate phase voltage unbalance.

Electrical insulators will consist of 18 segment strings with a total length of 103.5 inches and will be grey in color. Insulators for the towers will be arranged in a V-string configuration supporting each phase (Figure 1). Adequate electrical clearances would be maintained to obtain reliable and safe operation of the powerline.

Protection from lightning strikes will be obtained by two overhead shield cables, which will be supported at the uppermost extremities of the towers (Figure 1). These shield cables will intercept practically all lightning strikes and carry the strike current harmlessly to earth through the steel towers, thus preventing flashovers of the phase conductors to ground. Shield cables will be galvanized high strength steel conductors with a diameter of 3/8 inch.

All conductors and shield cables will be tension strung. In this procedure pulleys are mounted on the towers near where the conductors or shield cables attach, and a light rope is pulled through the pulleys. No heavy equipment is necessary for stringing a light rope, and consequently a road from tower to tower is not necessary. At intervals of about 17,000 feet along the line, tensioning and pulling equipment will be located to pull in a light steel cable using the rope already installed. The light steel cable will then be used to pull in the electrical conductors or shield cables. Pulleys will be lined with a protective material so the surface of the conductor remains smooth during stringing. Also, by proper adjustment of tension, the electrical conductors will be kept free of the ground where they might be scratched or accumulate deposits of dirt and foreign materials. Care in handling the conductor in this manner keeps the surface smooth, thereby minimizing corona and its associated electromagnetic radiation effects.

## GUIDELINES TO MINIMIZE ENVIRONMENTAL IMPACT

(Extracted from Applicant's Environmental Analysis, pp. 78-83)

### GUIDELINES FOR SELECTION OF CORRIDOR

1. Rights-of-way will be selected with the objective of ecological preservation in a manner that minimizes conflict with current and future land-use planning.

2. Properly sited established rights-of-way will be used where warranted to minimize the impact on the landscape.

3. Rights-of-way will avoid the national historic places listed in the National Register of Historic Places, the natural landmarks listed in the National Register of Natural Landmarks maintained by the Secretary of the Interior, and other historic places identified by the Arizona State Museum.

4. Archaeologists will be consulted to identify known archaeological sites in the area. In the final location of the centerline, archaeological sites will be identified by qualified archaeological consultants from the Arizona State Museum and avoided to the extent possible. If direct impact on a site cannot be avoided, excavation will be conducted under appropriate supervision. Although "salvage" archaeology is not preferred by most archaeologists, it prevents destruction or loss of relevant materials.

5. Known parks and the key scenic, wildlife and recreational lands officially designated by duly constituted public authorities will be avoided.

6. Rights-of-way will be selected with the purpose of minimizing conflict between the rights-of-way and present and prospective planning and zoning uses of the land on which they are to be located. Priority will be given to locating to coincide with or closely parallel existing transmission facilities; and the joint use of existing rights-of-way by different kinds of utility services will be considered.

7. Attempts will be made to obscure the view of the powerline and substations from major highways and other key points of view, especially by blending them into surrounding land features.

8. The proposed powerline will follow Federal Aviation Administration guidelines for the construction of structures that restrict the navigable air space.

# GUIDELINES FOR CONSTRUCTION

## Construction Facilities

1. The preservation of the landscape shall be an imperative consideration in the location of construction camps, storage areas, and buildings required temporarily in the performance of the work. Contractors' plans showing campsites, storage and housing facilities shall be submitted for approval of TGE before construction begins.

2. Such sites shall be kept as small as possible and will be located in available areas of minimum vegetation and slope. Full restoration and reshaping of these areas shall be made.

3. Borrow material area and batch sites will be authorized only by special permit. Full restoration and reshaping of these areas will be necessary.

4. All portions of work areas shall be maintained in a neat, clean and sanitary condition at all times. Toilets will be furnished where needed for the use of construction workers.

## Public Safety and Protection of Property

1. Operations shall be conducted so as not to close or obstruct any portion of any railroad, road or other property until permits have been obtained from the governmental or other authorities having jurisdiction.

2. Any phase of this operation may be temporarily halted for muddy ground conditions which would unnecessarily disturb the site. All operations may be required to cease during heavy rains.

3. All cultivated and planted areas and vegetation such as trees, plants, shrubs and grass on or adjacent to the premises, which do not reasonably interfere with the performance of work, shall be preserved and protected.

4. Reasonable precautions shall be taken to protect, in place, all public land survey monuments and private property corners. If any such land markers or monuments are inadvertently destroyed, they shall be reestablished or referenced in accordance with the procedures outlined in the "Manual of Instructions for the Survey of the Public Land of the United States" or the specifications of the county engineer, in the case of private property.

5. Firearms are not permitted to be carried by any construction worker involved in this project while he is on or in the vicinity of the project. Violators of any State, Federal or International law protecting wildlife will be referred to the proper authorities.

## Access Roads and Vehicle Movement

1. Travel will be permitted only on designated system or construction roads. No off-road travel will be allowed. This includes movement of equipment between tower sites and driving on the centerline.
2. System roads and other existing roads will be marked for use as access roads wherever feasible. It is the intent of TGE to hold construction of new roads to the absolute minimum.
3. New roads shall follow approved routes and shall be constructed with the minimum possible clearing and soil disturbance.
4. The road width shall be determined by need, such as equipment size, and shall be no wider than necessary. The maximum allowable width shall be 14 feet.
5. Unauthorized cross-country travel and creation of roads beyond those approved will be strictly prohibited. Measures to control all activity of this type will be enforced by TGE.
6. The limits of where construction equipment and vehicles can and cannot go will be clearly marked at each new site before equipment is brought in. Construction foremen and personnel shall be well versed in recognizing these markers and shall understand the restrictions on equipment movement that is involved.

## Clearing and Grading

1. Clearing for roads and right-of-way in desert scrub shall be limited to crushing rather than uprooting brush. Plants may be clipped off at ground level leaving roots undisturbed so that they may resprout. This will be done by brush blades or by hand.
2. Centerline clearing, where allowed, shall be limited to one cat blade width only, unless it is the approved access road to the next tower site.

3. Scalping of the earth or any unnecessary disturbance will not be allowed on any clearing, except in rocky areas, or on slopes where cuts and fills are necessary.

4. On some sensitive lands, hand clearing may be necessary. This will be determined on a site-by-site basis.

5. Leveling at the tower site shall be limited to the crane pad. The same restrictions as apply to cut and fill on temporary roads will be required for these pads to effect site restoration.

6. Unless large plants within the construction area interfere excessively with equipment movement during construction, such vegetation will not be removed but will be marked for preservation. This applies particularly to saguaro cactus and other vegetation of particular value.

7. In areas of over 4% sideslope, roads shall be constructed to a 4% outslope. The roads shall be constructed so that material will not be accumulated in one pile or piles. The material will be side-cast as construction proceeds and will not be side-cast so as to make a windrow on the downhill side. The cut banks shall be as near vertical as practical with no overhang.

8. No cutting and filling shall be allowed in areas of 4% sideslope or less.

## Stream Beds

1. Several ephemeral drainages will be crossed by the line and access roads. Clearing for roads and right-of-way shall be held to a minimum to reduce the potential for sediment entering these drains.

2. Roads shall cross drainage bottoms at right angles and level with the stream gradient.

3. There shall be no pushing of soil into stream beds.

## Fences and Cattleguards

1. All fences crossed by this powerline shall be provided with a steel gate or cattleguard, or both, not less than 12 feet long. All fences crossed by the line or access roads shall be "H" braced before the fence is cut.

2. Cattleguards shall be aligned at right angles with the roadway and shall be accompanied by a gate of sufficient width to accommodate all oversized construction equipment.

3. Any crossings that are to remain as major travel routes at the completion of the project shall be required to have standard concrete foundation cattleguards. Other less traveled roads approved for retention may utilize the standard timber supported cattleguard, which will remain in place when the project is complete.

4. All temporary roads shall have this same standard timber supported cattleguard. This will be removed at the completion of the project and the fence restored to its preconstruction condition. Temporary cattleguards are for the Contractor's convenience and metal gates can be substituted.

## Erosion

1. Erosion controls will be implemented in two stages: the temporary controls to last the duration of the construction activities and the permanent controls implemented by the clean-up crew at the time of road closing. The permanent controls are discussed in the road closure section.

2. Any stream or arroyo affected by construction shall have appropriate retainment structures to trap sediments.

3. Care shall be taken so that erosion problems do not develop below the construction site due to the channeling of water into new areas.

4. During or after heavy storms, it may be necessary to cease operations if vehicle movement is resulting in ruts or other major damage to soil surface.

## Archaeology

1. In the event that any Indian relics or items with any apparent archaeological or historical values are discovered during construction of the line, these relics or items shall not be touched, moved or otherwise disturbed.

2. Title to any relics, artifacts, fossils or other items of historical or archaeological value is expressly reserved in the landowner or agency having jurisdiction.

## Dust Control

1. All excavations, embankments, stockpiles, haul roads, permanent access roads, plant sites, waste areas, borrow areas, and all other work areas within or without the project boundaries shall be maintained free from dust that would cause the standards for air pollution to be exceeded or that would cause an extended hazard or nuisance to others.

2. Approved methods of stabilization consisting of sprinkling, chemical treatment, light bituminous treatment or similar methods will be used to control dust.

3. Dust control shall be performed as the work proceeds and whenever a dust nuisance or hazard occurs.

## Control of Fires

1. A fire plan shall be proposed that will set forth in detail the plan for prevention, control and extinguishing of fires on and in the vicinity of the project area.

2. Full compliance with fire laws and regulations shall be considered a necessity.

3. Blasting caps and powder shall be stored only in approved areas.

## Waste Disposal

1. General cleanup will be expected along working areas throughout the duration of the project to prevent littering.

2. Disposal of any materials, wastes, effluents, trash, garbage, oil, grease, chemicals, etc., shall be subject to the approval of the landowner.

3. All used oil or other petroleum products shall be hauled away. There shall be no release of crankcase oil, etc., into streams or the soil anywhere.

4. Sanitary wastes shall not be discharged into streams or any stream beds.

5. Water used in embankment material processing, aggregate processing, concrete curing, foundation and concrete lift cleanup, and other waste waters shall not be discharged into surface waters.

6. All non-combustible wastes such as conductor, ceramic or metal scraps shall be hauled away or buried. Permission will be obtained from the landowner before burial.

7. Combustible wastes such as packaging material shall be hauled away and disposed of upon leaving any work area.

8. In instances where disposal by burning seems preferable, it shall be done with small fires for the disposal of construction waste only.

9. Use of wood chipping or shredding for disposing of excess woody debris shall be consistent with the landowners' preference. Chipped or shredded plant materials shall be dispersed to serve as mulch rather than burned.

### Native Vegetation

1. Native vegetation that has been saved during construction shall be nurtured and allowed to grow. This shall include pruning away all broken limbs, clearing away all rubbish that might restrict growth, and mulching with wood chips where available and appropriate.

### Herbicides

1. The use of herbicides is prohibited.

## POST-CONSTRUCTION CLEANUP AND ROAD CLOSURE

1. All signs of temporary construction facilities such as haul roads, work areas, structures, foundations of temporary structures, stockpiles of excess or waste materials, or any other vestiges of construction shall be obliterated.

2. Filling and plowing of roadways will be required where appropriate to restore the area to near natural conditions which will permit the growth of vegetation thereon and discourage future traffic.

3. Any landscape feature scarred or damaged by equipment or operations shall be restored as nearly as possible to its original condition. Large damaged vegetation shall be treated and healed or removed and disposed of under requirements for clearing and grubbing.

4. In areas where no cut or fill was made, closure of roads shall be completed by barriers of berms, rocks, plants or whatever, and signs after scarifying, water-barring and revegetation are complete.

5. In areas of 30% sideslope, and less, the fill of the road shall be placed back into the roadway in such a manner that the equipment does not get outside the road prism. In areas of greater than 30% slope, the equipment shall knock the road shoulder down so that the slope nearly approximates the original slope of the land. The cut banks shall be pushed down into the road and a near normal side slope shall be reestablished. Water barring and revegetation shall be accomplished.

6. Replacement of earth adjacent to access roads crossing water shall be at slopes less than the normal angle of repose for the soil type involved.

7. Disturbance of drainage bottoms will be minimal and all bottoms shall be restored to their preconstruction gradient and width to prevent accelerated gully erosion.

8. Cross-drains shall be added at a 45° angle at 100-foot intervals on roads with slopes of less than 10% and at 50-foot intervals on roads with slopes in excess of 10% gradient.

9. Drainage systems shall be restored for all clearing centerlines upon completion of construction.

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## REVISED ENVIRONMENTAL ANALYSIS RECORD

Title: Westwing to El Sol to Agua Fria 230 kv Power Lines (two parallel towers and lines).

The Bureau of Land Management is considering the issuance of right-of-way to APS for construction of two power lines that will be used jointly by the Arizona Public Service Company and Tucson Gas and Electric.

The proposed transmission lines would be located near Sun City, Arizona, crossing Sec. 12, T. 4 N., R. 1 W.; Sections 7, 18, 19, 30, 31, T. 4 N., R. 1 E.; Sections 6, 7, 18, 19, 30, 31, 32, 33, 34, 35, 36, T. 3 N., R. 1 E.; and Sections 24 and 25, T. 3 N., R. 1 W., G&SR Mer. Total length of proposed line is approximately 16.7 miles of which 1.911 miles cross national resource lands.

## A. DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

Arizona Public Service and Tucson Gas and Electric have made a joint application for a right-of-way across 1.911 miles of national resource lands for two parallel, double circuit transmission lines. Each set of towers would carry a 230 kv (APS) and a 345 kv (TG&E) line between the existing Westwing Substation and a point one-half mile south of the existing El Sol Substation (see Figure 4). From that point the APS lines will continue easterly to the Agua Fria Substation (4.5 miles) and TG&E circuits will continue southerly to Tucson. The right-of-way will parallel rights-of-way granted previously (230 kv lines) to the Salt River Project (SRP) and the Bureau of Reclamation (USBR) for approximately 1½ miles east from the Westwing Substation. The SRP line has already been constructed and the towers on the USBR line are in place.

Then, from the point approximately 1½ miles east of Westwing, the proposed lines will turn south for approximately 1/2 mile to a point about 1,000 feet west of the existing SRP-USBR Liberty-Pinnacle Peak 230 kv line. The proposed lines will then approximately parallel the SRP-USBR line to a point about 1/2 mile south of the El Sol Substation. The APS portion of the line will tie into the El Sol Substation which will be expanded from its one-acre size to 40 acres. The TG&E portion of the line will bypass the substation.

At the point 1/2 mile south of the El Sol Substation, the proposed APS lines will turn east on one set of towers and parallel an existing SRP 230 kv line for approximately 4½ miles to the Agua Fria

Substation. No Federal lands are involved in this portion of the line. The TG&E lines will continue south to Vail Substation near Tucson (see attached map "Proposed Lines, Westwing to El Sol").

Thus, even though there is a joint application for the right-of-way from Westwing to El Sol, there are two distinct proposed actions taking place, viz. APS is proposing to build a relatively short city intertie system which involves a small portion of national resource land, and TG&E is proposing to build a relatively long intra-State delivery system involving a substantial amount of national resource land south of El Sol. TG&E's proposed action has been determined to be a major Federal action and an Environmental Impact Statement is being prepared in conformance with NEPA. The remainder of this analysis will concern itself with the proposed APS action.

APS proposes to construct two sets of towers along the right-of-way. The total length of line will be approximately 16.7 miles of which 1.911 miles cross national resource lands. The towers will be free-standing, galvanized steel lattice-type as shown on figure 4, which will vary in height from 120-170 feet and be spaced 800-1000 feet apart. The right-of-way width will be 300 feet along the northern end, and 224 feet along the remainder. Access will be by ground vehicles primarily utilizing the SRP's permanent access road along the Liberty-Pinnacle Peak 230 kv line. No additional permanent roads are proposed. Heavy equipment will be used to dig the tower foundations and set the towers.

Alternatives being considered by BLM are (1) relocate proposed line; (2) require line to be buried, and (3) reject the application.

## B. DESCRIPTION OF EXISTING ENVIRONMENT

### 1. Non-Living Components

#### a. Air.

The air quality in the Sun City area is fair. Visible pollution arising from the Phoenix metropolitan area is fairly common on windless days.

#### b. Land.

The Westwing to El Sol portion of the line primarily consists of the flood plain and the bench on the east edge of the Agua Fria drainage. The northern portion of the proposed route is primarily undeveloped or abandoned agricultural land and the southern portion is primarily flood plain skirting the west edge of Sun City, a major retirement residential development. All of the national resource land is undeveloped but showing some visible past disturbance by man. National resource lands make up about 12 percent of the entire proposed line.

The El Sol to Agua Fria portion of the line crosses predominantly irrigated farm land that is privately owned. The proposed expansion of the El Sol Substation is also entirely on privately owned land.

Present land use in the area is undergoing a significant transition. Del Webb Development Company, the major landholder in the Sun City area, indicates that all lands adjacent to the Agua Fria will be urbanized except the Agua Fria flood plain. This prediction is strengthened by the fact that Phoenix' current major growth direction is to the northwest toward Sun City.

c. Soils.

The soil types along the Westwing to El Sol portion of the proposed line are predominately sandy loam to gravelly sands. These soils are moderately unstable and tend to erode when disturbed. Most of the flood plain is already in a disturbed state. The agricultural land along the El Sol to Agua Fria portion of the line is predominately loam and clay loams. These are fairly stable soil types.

d. Water.

There is no live surface water affecting the proposed route. The annual precipitation is low, 7-10 inches, but heavy rainfalls cause moderate to heavy runoff in the Agua Fria and New River drainages which both affect the proposed line. The U.S. Corps of Engineers has made detailed flood control reports on both of these drainages. Structural tower designs have been modified to meet potential flood situation described in the Corps' reports.

## 2. Living Components

### a. Plants.

The natural vegetative type of the area is Southern Desert Scrub typical of the Lower Sonoran Zone. Much of the area has been disturbed and little natural vegetation remains. No endangered plant species have been found in the general area of the proposed lines. Several subtypes have been identified along the route and a brief description of these types follows:

Larcea - This subtype occurs on the terraces along the Agua Fria flood plain and is the type prevalent on most of the national resource land under application and the northern portion of the Westwing to El Sol route. The subtype is dominated by Larcea tridentata (creosotebush) with some scattered Franseria deltoidea (bursage).

Hymenoclea - This subtype dominates the drier portions of the flood plain. Major species are Hymenoclea salsola (cheesebush), creosotebush, and Circidium floridum (Blue palo verde). Some of this subtype occurs on the national resource lands under application and makes up most of the southern portion of the Westwing to El Sol route.

Palo verde - This subtype is prevalent along the drainage channels in the flood plain. Dominant species are Blue palo verde, cheesebush, Prosopsis velutina (mesquite), and Olneya tesota (ironwood). A very small amount of this occurs on national resource lands or along the route.

Agriculture - This subtype makes up most of the El Sol to Agua Fria portion of the route. Common species are cotton, cereal grains, and sorghum.

### b. Animals.

The animals that may occasionally be found in the area are those typical of the Lower Sonoran Zone. Native habitat is present on very little of the proposed route due to past disturbances by man. Most of the northern portion of the route from Westwing to El Sol adjoins native habitat. No endangered species' habitat is found along the proposed route. It is remotely possible that American perigrine falcons or bald eagles might rarely pass through the area but the proposed structures should not cause any problems for these species. A discussion of the various types of animals follows:

Amphibians - Populations of these animals are very low. A few toads (Bufa spp.) and bullfrogs (Rana catesbeiana) have been observed in the area, primarily in the agricultural habitats.

Reptiles - Reptiles are common, though not plentiful, in the area. Most common species are lizzards (size-blotched, whiptail, and Desert spiney), bullsnakes (Pituophis melanoleucus) and diamond-back rattlesnakes (Crotalus atrox).

Birds - Birds are common throughout the area. Most common species are mourning dove (Zennidura macroura), white-winged dove (Zenaidura asiatica), Gambel's Quail (Lophortyx gambelii), and house sparrows (Passer domesticus).

Mammals.- Mammals are common throughout the area but studies and observations indicate populations are fairly low. Most common species are kangaroo rats (Dipodomys merriami), deer mice (Peromyscus maniculatus), desert pocket mice (Perognathus penicillatus) and black-tailed jackrabbits (Lepus californicus). Game species that are commonly found in the Lower Sonoran Desert such as mule deer and cottontail rabbits are virtually non-existent in the area due to disturbance and lack of habitat.

## 3. Ecological Inter-relationships

The ecological inter-relationships present on lands in a natural state in the area are those typical of a climax ecosystem in the Lower Sonoran Biome. However, most of the proposed route is in a disturbed state. On the portion from El Sol to Agua Fria, the natural inter-relationshiops have been disrupted by the agricultural practices now taking place. Along the majority of the remainder of the proposed route, sand and gravel operations, previously constructed power lines, and residential development have moderately to severely interrupted the ecosystem. Natural inter-relationships are found primarily to the west of the proposed route in the flood plain and on the west bench of the Agua Fria drainage. (The proposed lines are on the east side of the river.)

### 4. Human Values

The aesthetic quality of the proposed route has already been degraded by the previously constructed power lines, however construction of two more sets of towers cannot avoid being an additional degradation. The massive steel lattice-type towers will be readily visible from Sun City. Visual impact will be partially modified by utilizing an existing corridor.

The Museum of Northern Arizona has conducted a comprehensive archeological investigation along the proposed route. Four sites were identified within the right-of-way (all on private land). These sites are considered to be integral parts of an important archeological resource area, the Lower Agua Fria drainage. Archeological knowledge is still incomplete and protection of these sites is highly desirable. The case file contains a detailed description of the sites in the archeological report submitted February 15, 1974, by the Museum of Northern Arizona.

## C. ANALYSIS OF PROPOSED ACTIONS

### 1. Environmental Impacts

a. Anticipated Impacts.

Proposed Action: Grant right-of-way with mitigation as necessary. The anticipated or possible impacts using the proposed route are basically:

(1) Aesthetic degradation caused by the construction of two additional sets of 230 kv towers (120-170 ft. high) along the 16.7 mile route.

(2) Temporary vegetative and soil disturbance caused by the heavy equipment to be used in constructing the lines and loss of vegetation at actual tower sites.

(3) A slight increase in noise pollution, primarily at the expanded El Sol Substation.

(4) Possibility of temporary dust pollution during construction.

(5) Possible destruction or damage of archeological sites.

Alternative No. 1 (Relocate Proposed Route): An extensive analysis of alternate routes was conducted by Western States Consultants, Inc. (copy in case file). Four feasible alternatives were located, including the proposal. Basically they can be described as follows:

Route No. 1 - Beginning at the Westwing Substation this proposed route leads southwest for approximately one mile then parallels the Agua Fria drainage on the high bench on the west to near Sun City, then heads southeast to the Agua Fria flood plain which it parallels to the El Sol Substation. Compared to the proposed line, it was found that this route was shorter and archeologically more acceptable, but visually more degrading, traversing a more natural type area, requiring construction of new access roads, creating a new power line corridor, and generally, was not as environmentally acceptable as the proposed route.

Route No. 2 - Beginning at the Westwing Substation, this proposed route heads south down the bottom of the flood plain of the Agua Fria directly to El Sol. This is the shortest route. Compared to the proposed route, this route was found to be less visible from surrounding areas, shorter, and archeologically more acceptable; but traversing a more natural type area, creating a new, or very wide, power line corridor, subject to greater flood danger, and was generally not as environmentally acceptable as the proposed route.

Route No. 3 - This route is the same as the proposed route except that instead of heading east from Westwing along the existing lines, it heads southeast approximately two miles to the existing Liberty-Pinnacle Peak line. The remainder of the route is the same as the proposed route (designated 3A on the attached map). Compared to the proposed route, this route is shorter and more archeologically acceptable but traverses more natural area, establishes a new power line corridor, and is generally slightly less environmentally acceptable.

Route No. 4 - This is the segment from south of El Sol to Agua Fria Substation. No viable alternatives were found for this segment. Thus, this portion of the proposed route is the same for all alternatives.

Alternative No. 2 (Bury the lines):
Though physically possible, this alternative is in a technical infancy stage. Underground extra-high voltage lines presently require encasement in oil. Reliability is lower than above-ground towers, thus more maintenance would be required along the line causing continued vegetative disturbance. The physical damage to the environment would actually be greater using this method, i.e. more vegetative and soil disturbance. Aesthetic problems would be reduced but the existing overhead lines would continue to degrade the area.

Alternative No. 3 (Reject application):
This alternative would definitely not prevent the proposed lines from being built from Westwing to El Sol. It would simply require that an alternate route containing no Federal land (which is possible) be utilized. Since the proposed route has been identified as the most environmentally acceptable, rejection is not a logical action.

b. Possible Mitigating or Enhancing Measures.

Mitigating measures are essentially the same for all alternative routes. It is possible to restrict vegetative and soil disturbance to the tower sites only. Construction can be completed without physically building any access roads. Potentially valuable archeological sites have been identified and can be avoided by modifying tower placements. Visual impact can be lessened by keeping the corridor as narrow as physically possible, using non-reflective materials and similar tower design. Restoration to near natural conditions by reseeding is possible, though not always successful in the desert climate.

c. Recommendations for Mitigation or Enhancement.

(1) Vegetative and soil destruction will be limited to tower sites only, which will reduce possible dust problems.

(2) No new permanent access roads will be constructed and off-road vehicle use will be held to an absolute minimum.

(3) Archeological sites will be staked and towers and equipment will be prohibited within the staked area.

(4) Towers will be non-reflective, steel, lattice-type, constructed as near parallel to existing towers as physically possible.

(5) Disturbed sites will be reseeded as directed by the Authorizing Officer.

d. Residual Impacts.

Residual impacts will be the visual degradation caused by the towers and the destruction of soil and vegetation at the tower sites.

Technical data presented by APS indicates this voltage line causes negligible television and radio interference. The lines will create some minimal additional noise pollution and the expansion of the El Sol Substation will also create additional noise pollution at that site. The noise level at the Substation will be approximately 60 decibles (the level of an average automobile) at the property boundary.

## 2. Relationships Between Short-Term Use and Long-Term Productivity

The short-term use of the route for the proposed power lines should have little effect on the long-term productivity of the area. Uses currently existing on the site will continue except for the tower sites themselves. The projected future use of most of the surrounding area is for residential purposes. These lines appear to be compatible as homes are commonly built along existing lines of this size.

### 3. Irreversible and Irretrievable Commitments of Resources

Construction of the proposed power lines will commit the east side of the Agua Fria drainage from Westwing to El Sol for use as a right-of-way corridor. This does not exclude the possibility that the land could be used for other compatible uses. The money and materials used to construct the lines are probably irreversibly committed.

## D. PERSONS, GROUPS, AND GOVERNMENTAL AGENCIES CONSULTED

1. Arizona Public Service Company
2. Tucson Gas and Electric Company
3. Power Plant and Transmission Line Siting Committee of Arizona.

The location of all power lines of 115 kv or larger in Arizona must be approved by this Committee. The group is established by Arizona Revised Statute, Section 40-360, et seq. Arizona Public Service went before this Committee on June 5, 1973, with a request for a Certificate of Environmental Compatibility for the previously described Route No. 2. Environmental Conscience, Inc., acted as an intervener in the hearing opposing the route preferred by APS. After lengthy discussion, it was decided that the Siting Committee would only approve the route applied for in this application (Route 3A). A copy of the Minutes of the hearing can be found in the case file (No. A-7731).

## E. INTENSITY OF PUBLIC INTEREST

Public interest in the Navajo Project has subsided since the cross-country 500 kv lines from Page to Phoenix (Westwing) were completed. There was some public interest in the proposed APS lines prior to the decision to locate the line along the already existing lines in the area. Since that time there has been little public interest.

## F. PARTICIPATING STAFF

Terry Driver, Natural Resource Specialist; Tom Rowley, Mining Engineer; Hank Molz, Outdoor Recreation Specialist; W. R. Brigham, Wildlife Biologist; M. E. Gonzales, Realty Specialist; Phillip D. Moreland, Realty Specialist.

## G. RECOMMENDATION ON ENVIRONMENTAL STATEMENT

Based on the above analysis, which shows that only a small amount of Federal land is involved, that the proposed action is basically an intra-city intertie system, that environmental damage has been greatly minimized by using existing power line corridors, that public interest in the proposed route is low, we conclude that the proposed action is not a major Federal action which will significantly affect the human environment. Thus, preparation of an Environmental Impact Statement is not recommended. The towers will be shared by APS and TG&E between Westwing and El Sol, and a final EIS is presently being prepared for the application for Right-of-Way by TG&E. It is recommended that this EAR be included as an Appendix in the EIS to show the relationship of this action to the over-all Navajo Power Plant and associated transmission lines.

SIGNATURES:

Prepared by Phillip D Moreland
9/10/74 (date)

Reviewed by
9/11/74 (date)
Concur: ✓ Disagree:__

Approved by
9-11-74 (date)

# PROPOSED LINES WESTWING TO EL SOL

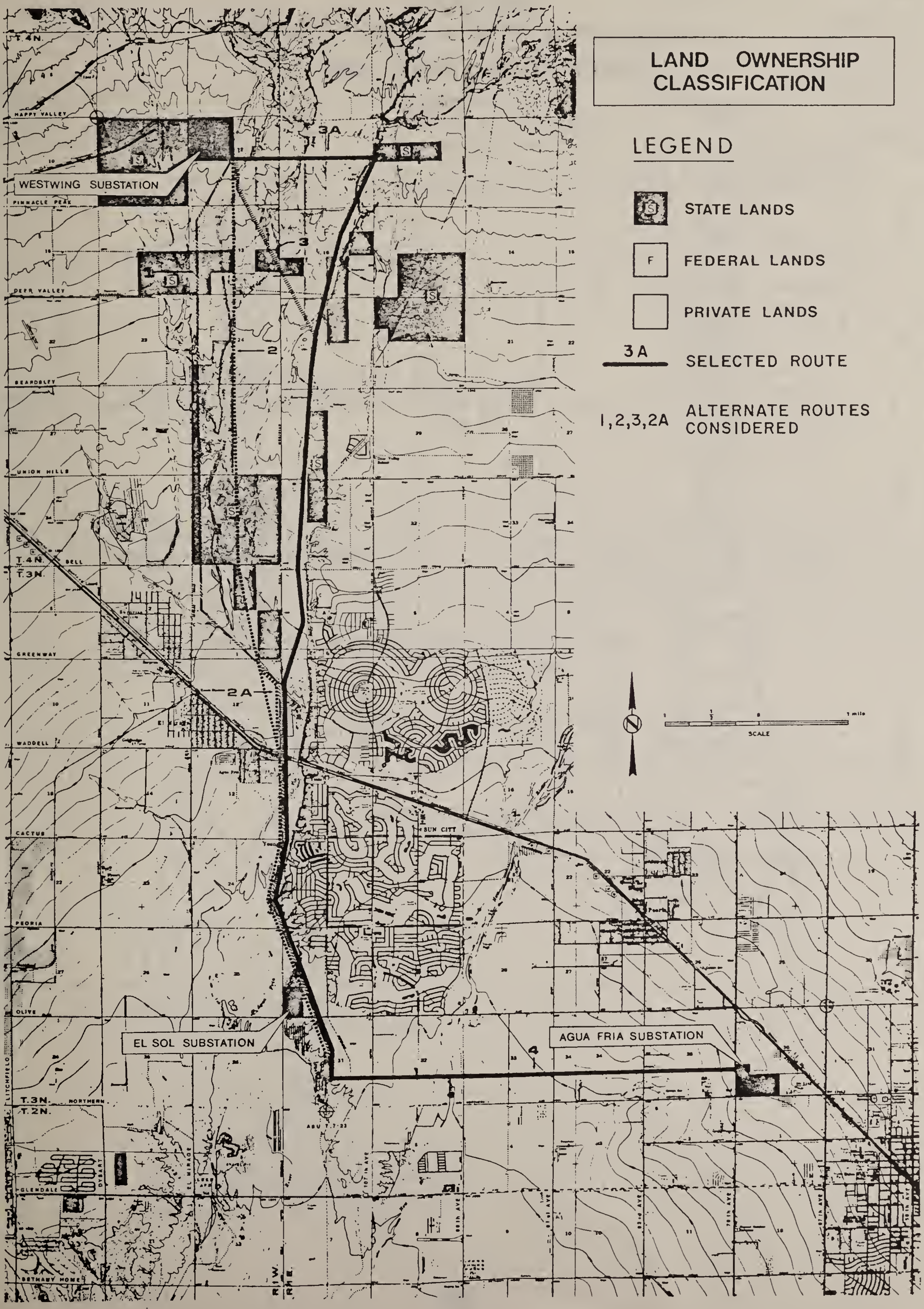
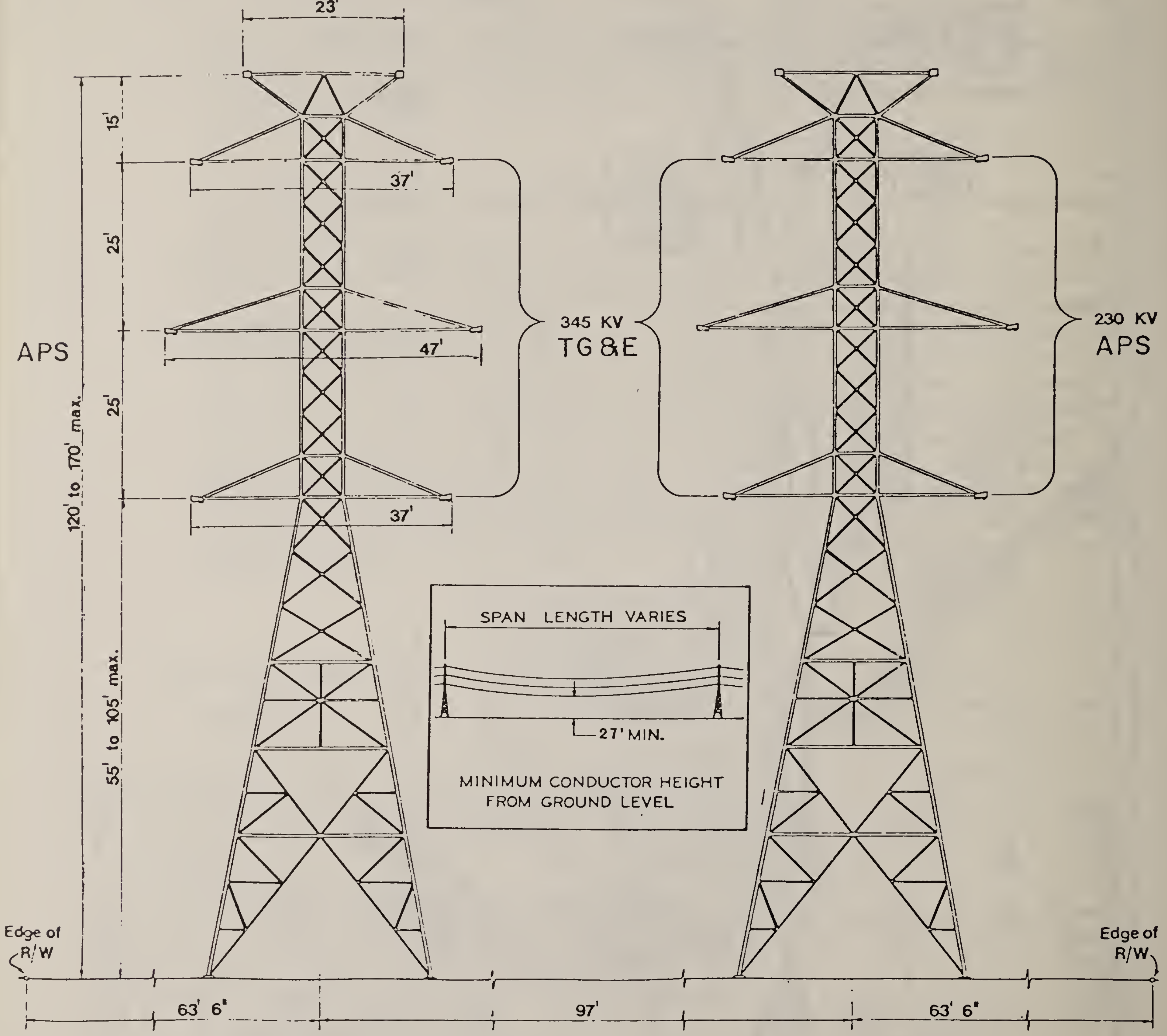


FIGURE No. 4

# PROPOSED
# TRANSMISSION TOWER CONFIGURATION
# WESTWING TO EL SOL



APPENDIX 13

**ERNEST GARFIELD**
CHAIRMAN

**CHARLES H. GARLAND**
COMMISSIONER

**AL FARON**
COMMISSIONER

**GEORGE M. DEMPSEY**
EXECUTIVE SECRETARY

**AWRENCE J. EVANS, JR.**
CHIEF HEARING OFFICER

1912

**ARIZONA CORPORATION COMMISSION**
1688 WEST ADAMS
PHOENIX, ARIZONA 85007
PHONE (602) 271-4166

**J. PATRICK RIORDAN**
ADMINISTRATIVE DIRECTO

**ROBERT G. KIRCHER**
UTILITIES DIRECTOR

**CLAUDE D. KELLER**
SECURITIES DIRECTOR

**ROSE SANDOVAL**
MOTOR CARRIER DIRECTO

**JAMES L. KAVALARIS**
INCORPORATING DIRECTO

**FRANK BOWMAN**
RAILROAD SAFETY AND
EMERGENCY VEHICLES DIREC

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JTV
TUCSON GAS & ELECTRIC

September 25, 1974

ARIZONA STATE OFFICE
BU. LAND MANAGEMENT
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ASSOC. SD
PCS
RESOURCES ✓
TECH SER
MGM'T SER
PUB. AFF
CF
ACTION
INFO
SEE ME

TO MEMBERS OF POWER PLANT &
TRANSMISSION LINE SITING
COMMITTEE:

Enclosed is a copy of Certificate of Environmental Compatibility, Case No. 15, IN THE MATTER OF THE APPLICATION OF TUCSON GAS & ELECTRIC COMPANY, IN CONFORMANCE WITH THE REQUIREMENTS OF ARIZONA REVISED STATUTES §40-360, ET SEQ., FOR A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY FOR AUTHORITY TO CHANGE LINE VOLTAGE FROM 345 KV TO 500 KV IN A PROPOSED TRANSMISSION LINE FROM WESTWING SUBSTATION TO VAIL SUBSTATION.

Very truly yours,

ARIZONA CORPORATION COMMISSION

Robert G. Kircher c.c.

ROBERT G. KIRCHER, DIRECTOR
Utilities Division

cc/w/encl. to:
Each Committee member
John O'Dowd
Charles Pierson
Donald E. Dickerman
Steve Beatty
N. M. Lovell
Charles McCauley
J. T. Via, Jr.
Luther Davis
Sherman R. Bendalin
Dennis L. Skarecky
Pima Co. Bd. Sup.

BEFORE THE

POWER PLANT AND TRANSMISSION LINE SITING COMMITTEE

IN THE MATTER OF THE APPLICATION )
OF TUCSON GAS & ELECTRIC COMPANY, )
IN CONFORMANCE WITH THE REQUIRE- )
MENTS OF ARIZONA REVISED STATUTES )
§40-360, ET SEQ., FOR A CERTIFICATE ) Case No. 15
OF ENVIRONMENTAL COMPATIBILITY FOR )
AUTHORITY TO CHANGE LINE VOLTAGE FROM )
345 KV TO 500 KV IN A PROPOSED TRANS- )
MISSION LINE FROM WESTWING SUBSTATION )
TO VAIL SUBSTATION. )

## CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY

Pursuant to notice given as provided by law, the Power Plant and Transmission Line Siting Committee ("the Committee") held a public hearing at the Williamsburg Room of the Hilton Inn, 1601 Miracle Mile, Tucson, Arizona, at 9:30 a.m., August 5, 1974, regarding the Application of Tucson Gas & Electric Company (the "Applicant"), in conformance with the requirements of Arizona Revised Statutes §40-360, et seq., for a Certificate of Environmental Compatibility for authority to change line voltage from 345 KV to 500 KV in a proposed transmission line from Westwing Substation, in the vicinity of Phoenix, Arizona, to Vail Substation, in the vicinity of Tucson, Arizona.

The following members of the Committee, a majority of the Committee, were present for the hearing:

John S. O'Dowd, designee
  for N. Warner Lee
Arlo B. Lee
James K. Wheat
John Little, designee
  for Andrew L. Bettwy
Carl Billings, designee
  for James D. Goff

Ken Rotta, designee
  for Ernest Garfield
Garvis Pollard, designee
  for Donald C. Gilbert
Robert D. Curtis, designee
  for Robert Jantzen
Clyde S. Roberts
John W. Beatty

Emil Haury, designee
for Raymond H. Thompson
Martin Wurbs, designee
for Wesley E. Steiner
Art Hall, designee
for Clifford C. Tabor
Clint Johnson, designee
for Bill Kane

The following members of the Committee were absent:

Dennis McCarthy
Joe P. Sparks
E. H. Weigel
Don Richards

The Applicant was represented by attorneys, Steven M. Beattie and Donald E. Dickerman. No party having duly served, as provided by law, written notice of intent to become a party, there were no intervenors to the proceeding.

Testimony was presented by witnesses for the Applicant, exhibits were introduced into evidence, and Committee members were given an opportunity to examine, and did examine, said witnesses.

The Committee, having considered the route proposed by the Applicant, and having been fully informed in the premises, upon motion duly made by John W. Beatty, and seconded by Arlo B. Lee, by a unanimous vote granted the Applicant the following Certificate:

> Tucson Gas & Electric Company is hereby granted a Certificate of Environmental Compatibility providing authority to change line voltage from 345 KV to 500 KV in a transmission line to be constructed from Westwing Substation, in the vicinity of Phoenix, Arizona, to Vail Substation, in the vicinity of Tucson, Arizona. The Applicant shall be entitled to determine whether said transmission line shall be constructed as a 345 KV or 500 KV line, and to so construct said transmission line, based upon economic, engineering and other factors as set forth during the presentation of the Applicant's testimony and evidence. The transmission line for which this Certificate is granted shall be constructed along the route described and depicted by the Applicant's hearing exhibits and by Appendix A to this Certificate of Environmental Compatibility.

This Certificate of Environmental Compatibility is granted on the further condition that Applicant comply with all applicable nuclear radiation standards, air and water pollution control standards and regulations, and with all applicable ordinances, master plans and regulations of the State of Arizona and the County of Pima.

GRANTED this 22nd day of August, 1974

THE POWER PLANT AND TRANSMISSION
LINE SITING COMMITTEE

By John S O'Dowd
Chairman

APPROVED BY ORDER OF THE ARIZONA CORPORATION COMMISSION BY THE COMMISSION:

Chairman　　Commissioner　　Commissioner

IN WITNESS WHEREOF, I, GEORGE M. DEMPSEY, Executive Secretary of the Arizona Corporation Commission, have hereunto set my hand and caused the official seal of this Commission to be affixed, at the Capitol in the City of Phoenix, this 25th day of September, 1974.

George M. Dempsey
GEORGE DEMPSEY
EXECUTIVE SECRETARY

file
ACC

A 7731

BEFORE THE

POWER PLANT AND TRANSMISSION LINE SITING COMMITTEE

IN THE MATTER OF THE APPLICATION OF )
ARIZONA PUBLIC SERVICE COMPANY, IN )
CONFORMANCE WITH THE REQUIREMENTS )
OF ARIZONA REVISED STATUTES § 40- )
360, et seq., FOR A CERTIFICATE OF ) Case No. 9
ENVIRONMENTAL COMPATIBILITY AUTHOR- )
IZING THE CONSTRUCTION OF TWO 230 KV )
TRANSMISSION LINES FROM WESTWING )
SUBSTATION TO EL SOL SUBSTATION TO )
AGUA FRIA SUBSTATION. )
)

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LAND OFFICE
PHOENIX, ARIZONA

## CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY

Pursuant to notice given as provided by law, the Power Plant and Transmission Line Siting Committee ("the Committee") held a public hearing at the Arizona Highway Department Auditorium, 206 South 17th Avenue, Phoenix, Arizona, at 2:00 P.M., June 5, 1973, regarding the Application of Arizona Public Service Company (the "Applicant"), in conformance with the requirements of Arizona Revised Statutes § 40-360, et seq., for a Certificate of Environmental Compatibility authorizing the construction of two 230 KV transmission lines from Westing Substation (existing) to El Sol Substation (existing) to Agua Fria Substation (existing).

The following members of the Committee were present for the hearing:

REC'D. R/W DEPT.
SEP 26 1973
ARIZONA PUBLIC SERVICE CO.

| | |
|---|---|
| Gary K. Nelson | Carl Billings, designee<br>for Arthur A. Aymar |
| Arlo B. Lee | |
| John W. Beatty | John Little, designee<br>for Andrew Bettwy |
| Robert Jantzen | |
| James K. Wheat | William L. Geiger, designee<br>for Donald C. Gilbert |
| Clifford C. Tabor | |
| Wesley E. Steiner | Ken Rotta, designee<br>for Al Faron |
| Robert Worden | |
| E. H. Weigel | |

The following members of the Committee were absent:

| | |
|---|---|
| Dennis McCarthy | Joe P. Sparks |
| Don Richards | Raymond H. Thompson |
| Clyde S. Roberts | |

The Applicant was represented by attorney, Thomas E. Parrish of the law firm of Snell & Wilmer. An intervenor, Environmental Conscience, Inc., having duly served, as provided by law, its written notice of intent to become a party, was represented by Attorney, Sherman Bendalin.

Testimony was presented by witnesses for the Applicant, and the Committee and the Intervenor were given an opportunity to examine said witnesses. The Intervenor presented no witnesses.

The Committee, having considered the alternative routes proposed by the Applicant, and having been fully informed in the premises, upon motion duly made by John Beatty and seconded by Bob Jantzen, unanimously granted the Applicant the following Certificate:

> Arizona Public Service Company is hereby granted a Certificate of Environmental Compatibility for the construction of two 230 KV transmission lines from Westwing Substation to El Sol Substation to Agua Fria Substation along the following described route:

Beginning at the midpoint on the east boundary of Westwing Substation; thence .25 mile in an easterly direction; thence approximately .25 mile in a northerly direction; thence approximately 1.5 miles in an easterly direction to a point just west of the existing USBR, SRP Pinnacle Peak-Agua Fria-Liberty 230 KV line in Section 8, Township 4 North, Range 1 East, thence approximately 5 miles in a southwesterly direction paralleling in general the existing USBR, SRP 230 KV line to a point in the south 1/2 of Section 6, Township 3 North, Range 1 East where the route leaves the existing line; thence in a southwesterly direction for approximately 0.8 miles to a point near the west section line of Section 7, Township 3 North, Range 1 East, thence in a southerly direction for approximately 2 miles to a point in the north 1/4 section of Section 19, Township 3 North, Range 1 East, where the line again parallels the existing USBR, SRP 230 KV Pinnacle Peak-Agua Fria-Liberty 230 KV line for approximately 2.4 miles to a point in the south 1/2 of Section 31, Township 3 North, Range 1 East where the SRP 230 KV line turns east to the Agua Fria station; thence in an easterly direction paralleling the existing SRP 230 KV line for approximately 4-1/2 miles across the south 1/2 portions of Sections 31, 32, 33, 34, and 35 of Township 3 North, Range 1 East to the Agua Fria Substation area in Section 36, Township 3 North, Range 1 East where the line will turn north and go approximately 1,000 feet in a northerly direction to join the Agua Fria-Glendale 230 KV line of APS.

The Applicant and the Committee have mutually agreed to waive the appointment of an independent engineering firm, as provided in Arizona Revised Statutes § 40-360.04.E, to determine the estimated increase in costs associated with construction and right of way acquisition imposed by reason of the Committee's action in certifying the above-described route rather than the alternative route preferred by the Applicant. The Committee has agreed to accept the Applicant's estimated cost of $3,429,500 for the certificated route compared to $2,838,400 for the preferred route which reflects an estimated increase in costs of $591,100.

This Certificate of Environmental Compatibility is granted on the further condition that Applicant comply with all applicable nuclear radiation standards, air and water pollution control standards and regulations, and with all applicable ordinances, master plans and regulations of the State of Arizona, the County of Maricopa, and the Towns of El Mirage, Peoria and Youngtown.

GRANTED this 18th day of June, 1973.

THE POWER PLANT AND TRANSMISSION
LINE SITING COMMITTEE

By
Chairman

APPROVED BY ORDER OF THE ARIZONA CORPORATION COMMISSION

| (S) Farron | (S) Williams | (S) GARLAND |
|---|---|---|
| Chairman | Commissioner | Commissioner |

IN WITNESS WHEREOF, I, GEORGE M. DEMPSEY, Executive Secretary of the Arizona Corporation Commission, have hereunto set my hand and caused the official seal of this Commission to be affixed, at the Capitol in the City of Phoenix, this 26 day of July, 1973.

(S)
GEORGE M. DEMPSEY
EXECUTIVE SECRETARY

ARCHAEOLOGICAL RESOURCES LOCATED IN THE TUCSON GAS & ELECTRIC EL SOL-VAIL TRANSMISSION LINE RIGHT-OF-WAY, Arizona State Museum, University of Arizona, R. Gwinn Vivian, Archaeologist, June 15, 1974.

## ABSTRACT

To insure environmental compatibility in the placement of transmission towers for the proposed El Sol-Vail transmission line, the Tucson Gas & Electric Company commissioned the Arizona State Museum to locate archaeological resources in the right-of-way. The museum fielded a four-man archaeological crew during March and April of 1974 to intensively survey the 182.5 mile route. The crew walked the line, beginning in the Agua Fria Valley near Phoenix and travelling in a southeasterly direction to the Tucson Basin.

A total of 34 cultural features were identified; 33 of them received Arizona State Museum site designations (Table 1). These sites are representative of several cultural periods. Spanning several hundred years, sites known in these areas date from the preceramic Cochise complex (about 2000 B.C.) to the Hohokam Colonial period (A.D. 500 to 900) and Classic period (A.D. 1100 to 1400). The Hohokam sites are usually divided into two major subdivisions which correspond to geographic areas. The first area, the Salt-Gila Basin was inhabited by the "riverine" Hohokam. The second, the Papaguería, was inhabited by the "desert" Hohokam. The subsistence practices of the "desert" Hohokam were adapted to their desert environment; many other traits they shared with the "riverine" Hohokam. A third Hohokam variant is found in the Tucson Basin. However, no sites were located along the transmission line where it traversed the Tucson Basin.

The purpose of this survey was to locate sites that would be affected by tower placement. To evaluate these effects, site disturbance in relation to the loss of information potential at each site has to be defined. To accomplish this each site is recorded in an effort to interpret past human activities, and to provide information for a comprehensive and effective management program, for either preservation or mitigation of the archaeological resource. Emphasis is placed on environmental and cultural variables and how they relate to each other. Sites were also evaluated from a historic perspective. A major management consideration was the recognition of sites that were of possible State or National Register of Historic Places status. Locally and regionally these sites are important from a scientific perspective, but at this time none of the sites have been recommended for nomimation to the registers.

As this project consisted of a linear survey, geographically defined cultural areas were crossed. Relationships to the immediate social and environmental systems, except in the broadest cultural-historical frameworks, are unavailable for comparative study. The research orientation, therefore, focused on intra-site or site specific

adaptive responses. A general regional question which has been posed by the Southwestern Anthropological Research Group was asked, "Why are sites located where they are?"

The Tucson Gas & Electric Company policy with regard to archaeological resource management is to avoid locating transmission towers on sites whenever possible. We have recommended that 30 sites be avoided by TG&E. In order to reach a final decision on the three remaining sites, Tucson Gas & Electric Company has asked the museum to make test excavations. Two of the sites, Arizona T:11:31 and AA:10:3, occur at points of intersection on the line. These intersections affect engineering alignment of the line beyond the point. Both sites are lithic scatters although T:11:31 also consists of a petroglyph and trail. Testing in conjunction with current research into lithic procurement and manufacturing would enable the sites' potential to be fully evaluated.

The third site, Arizona AA:14:14, is a large sherd and lithic scatter (approximately one-half kilometer long) with two trash mounds. These indicate the presence of subsurface features and structures, possibly pithouses. It is possible that this site could not be spanned by the transmission poles. If subsurface material is found, this would affect the information potential of the site. Subsurface tests would investigate this possibility in terms of current research methods and theory into habitation sites.

Sites that remain delicately balanced with the environment for hundreds of years suffer disproportionately from the effect of modern disturbances. Direct impact will be lessened by avoidance of most sites and test excavation prior to a final decision on three site locations. Indirect impact cannot be easily quantified. Much of it can be lessened through monitoring the construction phase of the project where sites are involved. However, if traffic increases along the line, sites that have been spanned will suffer. Therefore, an additional recommendation, in line with Tucson Gas & Electric activities, would be to lessen the traffic along the route by obliterating construction roads which will not be used after project completion, thus making access more difficult. This recommendation is contingent upon the desires of the landowners.

A management program based on the survey report "An Archaeological Survey of Tucson Gas & Electric El Sol-Vail Transmission Line," by J. McDonald, D. Phillips, Y. Stewart, and R. Windmiller, is outlined in Table 2. Full archaeological clearance under State and Federal Antiquities Acts protecting archaeological resources will be recommended, contingent upon the monitoring and test excavation of the management program.

## TABLE 1

## ARCHAEOLOGICAL RESOURCES LOCATED IN THE TUCSON GAS & ELECTRIC EL SOL-VAIL TRANSMISSION LINE RIGHT-OF-WAY

| A.S.M. Site | Micro-Environmental Setting | Description | Cultural-Temporal Affiliation | Surface Disturbance % of Site Area |
|---|---|---|---|---|
| T:7:12 (TGE-1) | gravel terrace; creosote-bush-bursage community; creosote dominant | sherd & lithic scatter 1125 m$^2$ | Hohokam: Classic period | 20% |
| T:7:13 (TGE-2) | gravel terrace; creosote-bush-bursage community; creosote dominant | sherd & lithic scatter 160 m$^2$ | Hohokam: period unknown | 5% |
| T:11:24 (TGE-3, 4) | silt terrace; riparian association; mesquite dominant | sherd & lithic scatter, canal; probable pithouse village; 176,000 m$^2$; inverted U-shape | Hohokam: Classic period, Soho phase | 30-40% |
| T:11:27 (TGE-5) | bajada (ridge); paloverde-sahuaro community; creosote dominant | lithic scatter; prehistoric trail, 10,000 m$^2$ | Prehistoric | 5% |
| T:11:28 * (TGE-6) | bajada (wash); paloverde-sahuaro community; creosote dominant | lithic scatter, 300 m$^2$ | Prehistoric | 5% |
| T:11:29 * (TGE-11) | bajada (ridge); paloverde-sahuaro community; creosote dominant | sherd & lithic scatter; petroglyphs; prehistoric trail; 80,000 m$^2$ | Hohokam: period unknown | 10% |
| T:11:30 * (TGE-12) | bajada; paloverde-sahuaro community; creosote dominant | lithic scatter; prehistoric trail; 15,000 m$^2$ | Prehistoric | 5% |

*BLM

TABLE 1 (cont.)

| A.S.M. Site | Micro-Environmental Setting | Description | Cultural-Temporal Affiliation | Surface Disturbance % of Site Area |
|---|---|---|---|---|
| T:11:31 * (TGE-13) | bajada; paloverde-sahuaro community; creosote dominant | lithic scatter; petroglyph; prehistoric trail; 44,000 $m^2$ | Prehistoric | 5% |
| T:16:41 * (TGE-7) | bajada (ridge); paloverde-sahuaro community; creosote dominant | sherd & lithic scatter; prehistoric trails; 1,200 $m^2$ | Hohokam: period unknown | 10% |
| Z:4:3 * (TGE-8) | outwash plain; creosote-bush-bursage community; creosote dominant | sherd & lithic scatter; 6,500 $m^2$ | Hohokam: period unknown | 5% |
| Z:4:4 * (TGE-9) | outwash plain; creosote-bush-bursage community; creosote dominant | sherd & lithic scatter; 625 $m^2$ | Hohokam: period unknown | 5% |
| Z:4:5 * (TGE-10) | Vekol washplain; creosote-bush-bursage community; creosote dominant | lithic scatter; 1,500 $m^2$ | Prehistoric | 5-10% |
| Z:4:6 * (TGE-14) | volcanic ridge; paloverde-sahuaro community; creosote dominant | sherd & lithic scatter; prehistoric trail - historic trash; semi-circular rock outline; 11,000 $m^2$ | Hohokam: period unknown<br>Historic | 15% |
| Z:4:7 * (TGE-15) | volcanic ridge; paloverde-sahuaro community | three prehistoric trails; associated lithics & sherds; petroglyph | Hohokam: period unknown | 5% |
| AA:5:48 ** (TGE-16) | Santa Rosa Wash plain; creosotebush-bursage community; creosote dominant | sherd scatter; 13,000 $m^2$ | Hohokam: Colonial period | 5% |

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** PAPAGO INDIAN RESERVATION

TABLE 1 (cont.)

| A.S.M. Site | Micro-Environmental Setting | Description | Cultural-Temporal Affiliation | Surface Disturbance % of Site Area |
|---|---|---|---|---|
| AA:5:49 ** (TGE-17) | Santa Rosa Wash floodplain riparian association; mesquite dominant | sherd & lithic scatter; 2 (?) trash mounds; probable pithouse village; 20,700 $m^2$ | Hohokam: period unknown | 15-20% |
| AA:5:50 ** (TGE-18) | Santa Rosa Wash plain; creosotebush-bursage community; creosote dominant | sherd & lithic scatter; trash mound (?); probable pithouses; 975 $m^2$ | Hohokam: Classic period | 5% |
| AA:5:51 ** (TGE-19) | bajada; paloverde-sahuaro community; creosote dominant | lithic scatter; 5,750 $m^2$ | Prehistoric | 5% |
| AA:5:52 ** (TGE-20) | bajada; paloverde-sahuaro community; creosote dominant | 15 petroglyphs; 4,000 $m^2$ | Hohokam: period unknown | 5% |
| AA:5:53 ** (TGE-21) | talus slope; paloverde-sahuaro community; creosote dominant | sherd & lithic scatter; 2 prehistoric trails; 500 $m^2$ | Hohokam: period unknown | 15% |
| AA:10:2 ** (TGE-22) | outwash plain; creosotebush-bursage community; creosote dominant | sherd & lithic scatter; 3 trash concentrations; probable pithouses; 95,475 $m^2$ | Hohokam: Classic period | 10% |
| AA:10:3 ** (TGE-23) | knoll; paloverde-sahuaro community though bursage dominant | lithic scatter; 10,000 $m^2$ | Prehistoric | 5-10% |
| AA:10:4 ** (TGE-24) | outwash plain; creosotebush-bursage community; creosote dominant | sherd & lithic scatter; 4 trash concentrations; probable pithouses; 28,750 $m^2$ | Hohokam: Classic period | 5% |

** PAPAGO INDIAN RESERVATION

### TABLE 1 (cont.)

| A.S.M. Site | Micro-Environmental Setting | Description | Cultural-Temporal Affiliation | Surface Disturbance % of Site Area |
|---|---|---|---|---|
| AA:10:5 * * (TGE-25) | outwash plain; creosotebush-bursage community; creosote dominant | sherd & lithic scatter; 27,000 $m^2$ | Hohokam: Classic period | 5% |
| AA:10:6 * * (TGE-26) | bajada; creosotebush-bursage community; creosote dominant | sherd scatter; 2,700 $m^2$ | Hohokam: Classic period, Soho phase | 5-10% |
| AA:14:13 * * (TGE-27) | bajada; creosotebush-bursage community; creosote dominant | sherd & lithic scatter with trash concentrations; probable pithouses; 115,500 $m^2$ | Hohokam: Classic period, Soho phase | 5-10% |
| AA:14:14 * * (TGE-28) | outwash plain; creosotebush-bursage community; creosote dominant | sherd & lithic scatter; 2 trash mounds; probable pithouses; 174,900 $m^2$ | Hohokam: Classic period, Soho phase | 5% |
| AA:15:11 * * (TGE-29) | foothill; paloverde-sahuaro community; creosote dominant | lithic scatter; 5,525 $m^2$ | Prehistoric | 5% |
| AA:15:12 * (TGE-30) | bajada; paloverde-sahuaro community; creosote dominant | sherd & lithic scatter; hearth; 70,000 $m^2$ | Hohokam: Classic period, Soho phase | 5% |
| AA:15:13 (TGE-31) | wash; riparian association; mesquite dominant | sherd & lithic scatter; 2 hearths; 300 $m^2$ | Hohokam: period unknown | 10% |
| AA:15:14 (TGE-32) | bajada; creosotebush-bursage community; creosote dominant | sherd & lithic scatter; 2 hearths; 30,000 $m^2$ | Hohokam: Classic period, Soho phase | 5% |

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TABLE 1 (cont.)

| A.S.M. Site | Environmental Setting | Description | Cultural-Temporal Affiliation | Surface Disturbance % of Site Area |
|---|---|---|---|---|
| AA:15:15 (TGE-33) | outwash plain; creosote-bush-bursage community; creosote dominant | sherd & lithic scatter; 3,200 $m^2$ | Hohokam: Classic period, Soho phase | 5% |
| DD:4:76 (TGE-34) | bajada; paloverde-sahuaro community; creosote dominant | 3 bedrock mortars; sherd in association; 25 $m^2$ | Prehistoric | 10-15% |

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